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SCIENCE AND TECHNOLOGY  
SOLDIER SYSTEM INTEGRATION**



**TECHNICAL REPORT  
NATICK/TR-96/012**

**AD \_\_\_\_\_**

# **BIOMECHANICAL ANALYSIS OF MILITARY BOOTS: PHASE II**

## **VOLUME II**

### **Human User Testing of Military and Commercial Footwear**

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13. ABSTRACT (Maximum 200 words)  
This is a two-volume report on human user testing of military and commercially available footwear. Volume I, NATICK/TR-96/011, contains the body of the report, and references; Volume II, NATICK/TR-96/012, contains the appendices comprised principally of summary statistics. The military footwear tested consisted of the black leather combat boot and the hot weather boot; the commercial items were a basketball shoe, cross trainer, hiking boot and work boot. Men and women performed the following activities in a laboratory setting while wearing each footwear type: walking, marching, running, jumping from heights and running an agility course. The data acquired included ground reaction forces, in-shoe pressures, sagittal plane kinematics, rearfoot movement, leg muscle activity, metabolic rate, and heart rate. The results indicated that the magnitudes of vertical ground reaction forces were lowest with the basketball shoe and the cross trainer. The military and the work boots were associated with lowest amounts of ankle dorsiflexion and the greatest degrees of flexion at the metatarsal-phalangeal joints. The fastest times to completion of the agility course were achieved with the basketball shoe and the cross trainer. The third report in this series is "Biomechanical Analysis of Military Boots: Phase III Recommendations for Design of Future Military Boots," NATICK/TR-96-013. Phase I is "Biomechanical Analysis of Military Boots: Materials Testing of Military and Commercial Footwear," NATICK/TR-93/006.

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## PREFACE

This final report for Phase II of the biomechanical analysis of military boots and other footwear was prepared under U.S. Army Soldier Systems Command, Natick Research, Development and Engineering Center contract DAAK60-91-C-0102. The work was performed at the Biomechanics Laboratory, Department of Exercise Science, University of Massachusetts, Amherst, MA. The project officer for the contract was Dr. Carolyn K. BenseL. Dr. BenseL is affiliated with the Behavioral Sciences Division, Science and Technology Directorate. This project is part of the 6.2 program 1L162723AH98AAKOO (Aggregate Code T/B1368) -- Biomechanical Approach to Soldier-CIE Integration, which is being carried out by Dr. BenseL and other members of the Behavioral Sciences Division.

This report for Phase II is in two volumes. Volume I (NATICK/TR-96/011) contains the body of the report, including references; Volume II (NATICK/TR-96/012) contains the appendices, which are comprised principally of summary statistics. The references for the other reports in the series are:

Hamill, J. and BenseL, C. K. (1992). *Biomechanical analysis of military boots. Phase I: Materials testing of military and commercial footwear* (Tech. Rep. NATICK/TR-93/006). Natick, MA: U.S. Army Natick Research, Development and Engineering Center.

Hamill, J. and BenseL, C. K. (1996). *Biomechanical analysis of military boots. Phase III: Recommendations for the design of future military boots* (Tech. Rep. NATICK/TR-96/013). Natick, MA: U.S. Army Natick Research, Development and Engineering Command.

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## **APPENDIX A**

### **PAR-Q PHYSICAL ACTIVITY QUESTIONNAIRE AND LOWER EXTREMITY EVALUATION PROTOCOL**

## PAR-Q PHYSICAL ACTIVITY READINESS QUESTIONNAIRE

Please circle YES or NO

- |     |    |  |
|-----|----|--|
| Yes | No | 1. Has your doctor ever said you have heart trouble?   |
| Yes | No | 2. Do you frequently have pains in your heart and chest?   |
| Yes | No | 3. Do you often feel faint or have spells of severe dizziness?   |
| Yes | No | 4. Has a doctor ever said your blood pressure was too high?  |
| Yes | No | 5. Has your doctor ever told you that you have a bone or joint problem such as arthritis that has been aggravated by exercise, or might be made worse with exercise? |
| Yes | No | 6. Is there a good physical reason not mentioned here why you should not follow an activity program even if you wanted to?   |
| Yes | No | 7. Are you over age 65 and not accustomed to vigorous exercise?  |

I have read and understand this document.

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

## LOWER EXTREMITY EVALUATION

SUBJECT NAME: \_\_\_\_\_

SUBJECT NUMBER: \_\_\_\_\_

S. MEDICAL HISTORY

YES NO

1. Any symptoms in the last 6 months for foot, lower leg, knee, or hip?

--- ---

Details:

2. Have you ever been prescribed orthoses or been diagnosed for hyperpronation?

--- ---

Details:

3. Do you have a family history of "flat feet," hyperpronation, or other foot problems?

--- ---

Details:O. PHYSICAL EXAMINATION

## 1. WEIGHT BEARING

## a. Posture

1. hyperlordosis\_\_\_\_\_

2. kyphosis\_\_\_\_\_

3. head forward\_\_\_\_\_

4. excessive pelvic

tilt\_\_\_\_\_

Details:

*Appendix A*

b. Lower Extremity

1. antero/retroverted

hip \_\_\_\_\_

3. patella squint \_\_\_\_\_

5. asymmetries \_\_\_\_\_

2. genu valgus/

varus \_\_\_\_\_

4. pigeon toes \_\_\_\_\_

Details:

b. Foot

1. rearfoot valgus \_\_\_\_\_

3. subtalar neutral \_\_\_\_\_

5. talar bulge \_\_\_\_\_

2. rearfoot varus \_\_\_\_\_

4. pinch callus \_\_\_\_\_

Details:

2. NON-WEIGHT BEARING

1. abnormal callus pattern \_\_\_\_\_

2. forefoot varus \_\_\_\_\_

4. rearfoot varus \_\_\_\_\_

6. Morton's foot \_\_\_\_\_

7. Other (describe) \_\_\_\_\_

3. forefoot valgus \_\_\_\_\_

5. rearfoot valgus \_\_\_\_\_

Details:

A. ASSESSMENT

Check one

1. Normal foot/lower extremity

2. Pathological foot/lower extremity

3. Include in study?

## **APPENDIX B**

### **ADDITIONAL INFORMATION ON DEPENDENT MEASURES**



## ADDITIONAL INFORMATION ON DEPENDENT MEASURES

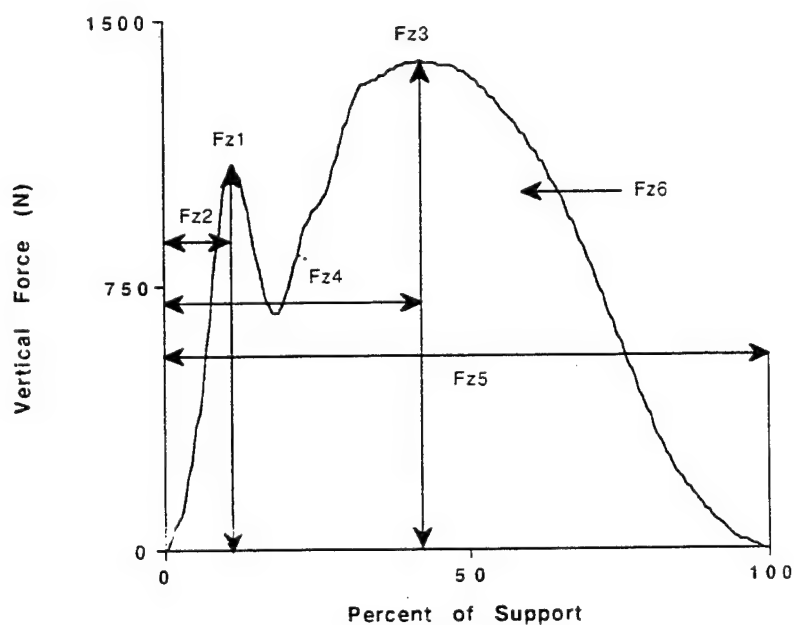
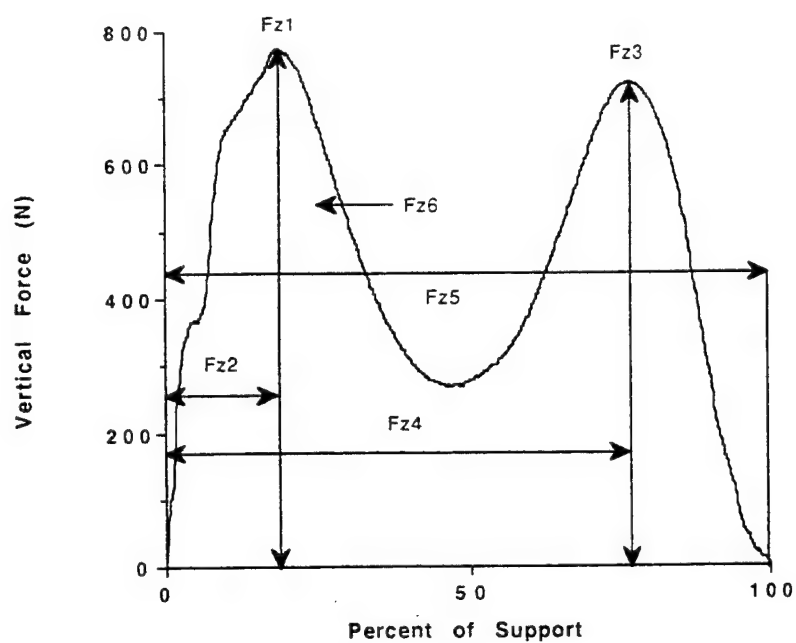
The data acquired during overground locomotion and during the jump/landings consisted of many parameters. Further descriptions of the parameters, along with some related illustrations, are presented in this appendix. Information related to the overground movements is followed by information related to the jump/landings.

### Overground Walking, Marching, and Running

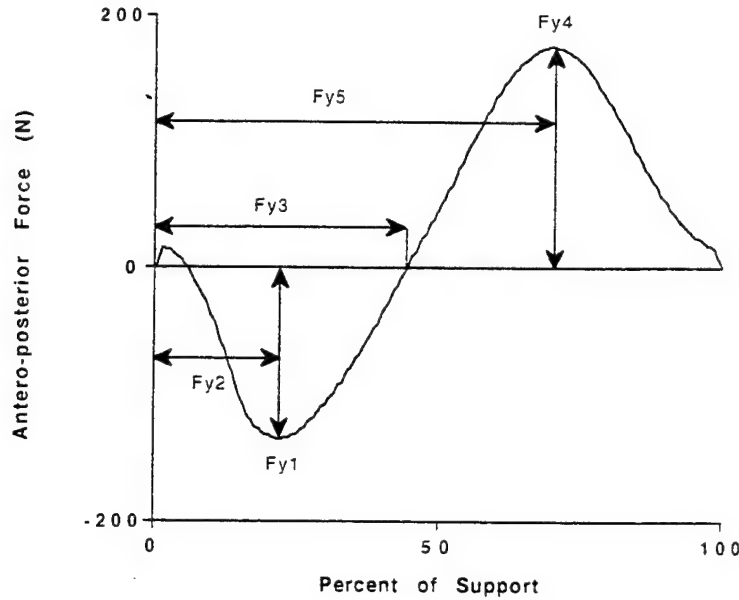
Graphic representations of vertical ground reaction force-time curves during walking and running are in Figure B-1. Antero-posterior and medio-lateral ground reaction force-time curves during walking are in Figures B-2 and B-3, respectively. Typical curves for marching and running differ from these in the magnitude of the force. However, the parameters embodied in the curves are the same, regardless of locomotor pace. The parameters associated with each of the force components are illustrated in the figures.

For the medio-lateral force component (Figure B-3), the force excursions  $Fx1$  and  $Fx2$  were calculated as the sum from  $i$  equals 1 to  $n$  of the absolute value of  $Fx_{i+1}$  minus  $Fx_i$ , where  $i$  equals force recorded at the rate of 1000 Hz. For  $Fx1$ , the excursions were calculated over the first 30% of the foot contact, or support, period; for  $Fx2$ , they were calculated over 100% of the support period.

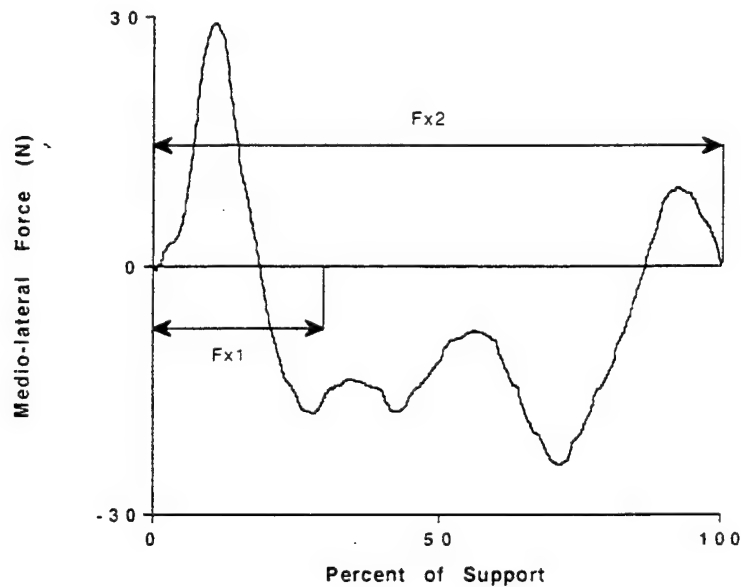
The parameters used to describe in-shoe pressure are illustrated in Figure B-4. To obtain the values for the pressure parameters  $P1$  and  $P2$ , the foot, exclusive of the toes, was divided into thirds along its length. The resulting regions were the heel, the midfoot, and the forefoot. The value of  $P1$  was the highest pressure reading obtained in the heel region during the support phase; the value of  $P2$  was the highest reading obtained in the forefoot region. To obtain the value of  $P3$ , centers of pressure (COP) were calculated from the pressures recorded at the rate of 100 Hz. The absolute values of the changes in distance between the COPs during the support phase were then summed to obtain the total distance that COP moved between foot strike and toe-off.



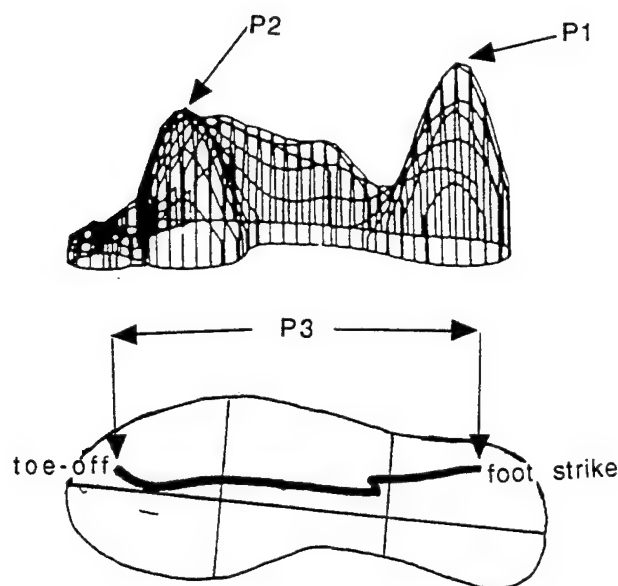
**Figure B-1.** Graphic representation of the vertical component of the ground reaction force during walking (upper figure) and running (lower figure). The parameters are: Fz1 -- first maximum force; Fz2 -- relative time to first maximum force; Fz3 -- second maximum force; Fz4 -- relative time to second maximum force; Fz5 -- average vertical force; Fz6 -- total vertical impulse.



**Figure B-2.** Graphic representation of the antero-posterior component of the ground reaction force during walking. The parameters are:  $F_{y1}$  -- maximum braking force;  $F_{y2}$  -- relative time to maximum braking force;  $F_{y3}$  -- relative time to transition force;  $F_{y4}$  -- maximum propelling force;  $F_{y5}$  -- relative time to maximum propelling force.



**Figure B-3.** Graphic representation of the medio-lateral component of the ground reaction force during walking. The parameters are:  $F_{x1}$  -- force excursions 0-30% of contact time;  $F_{x2}$  -- force excursions 0-100% of contact time.



**Figure B-4.** Graphic representation of in-shoe pressure patterns. The parameters are: P1 -- peak heel pressure; P2 -- peak forefoot pressure; P3 -- total movement distance center of pressure.

With regard to the sagittal plane kinematics, the marker locations and the conventions used in calculating the joint angles are illustrated in Figure B-5. The angles are further defined in the text below.

Definitions of the joint angles are as follows:

Trunk angle ( $\Theta_{Tr}$ ) -- the angle between the horizontal and the mean axis of the spine measured from the distal end of the spine, with positive in a counter-clockwise direction. The axis of the spine is defined as the line joining the highest point on the iliac crest to the greater trochanter.

Thigh angle ( $\Theta_{Th}$ ) -- the angle between the horizontal and the long axis of the thigh measured from the distal end of the thigh (lateral femoral epicondyle), with positive in a counter-clockwise direction.

Shank angle ( $\Theta_{Sh}$ ) -- the angle between the horizontal and the long axis of the lower leg measured from the distal end of the shank (lateral malleolus), with positive in a counter-clockwise direction.

Foot angle ( $\Theta_F$ ) -- the angle between the horizontal and a line projecting from the 5th metatarsal head to the heel, with positive in a counter-clockwise direction.

Hip angle ( $\Theta_H$ ) -- the angle between the thigh and trunk. +ve for flexion, -ve for extension.

Knee angle ( $\Theta_K$ ) -- the angle between the thigh and shank. +ve for flexion, -ve for extension.

Ankle angle ( $\Theta_A$ ) -- the angle between the shank and the foot minus  $90^\circ$ . +ve for plantarflexion, -ve for dorsiflexion.

Metatarsal angle ( $\Theta_M$ ) --  $180^\circ$  minus the foot angle. It can also be defined as the angle between the horizontal and the line formed by connecting the markers at the heel and the 5th metatarsal-phalangeal joint.

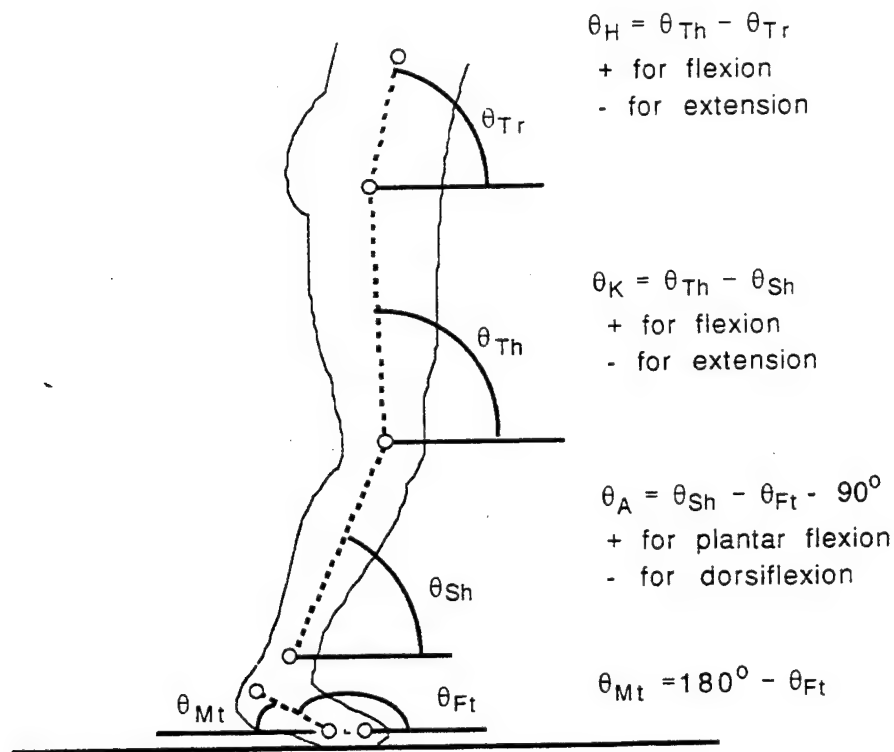
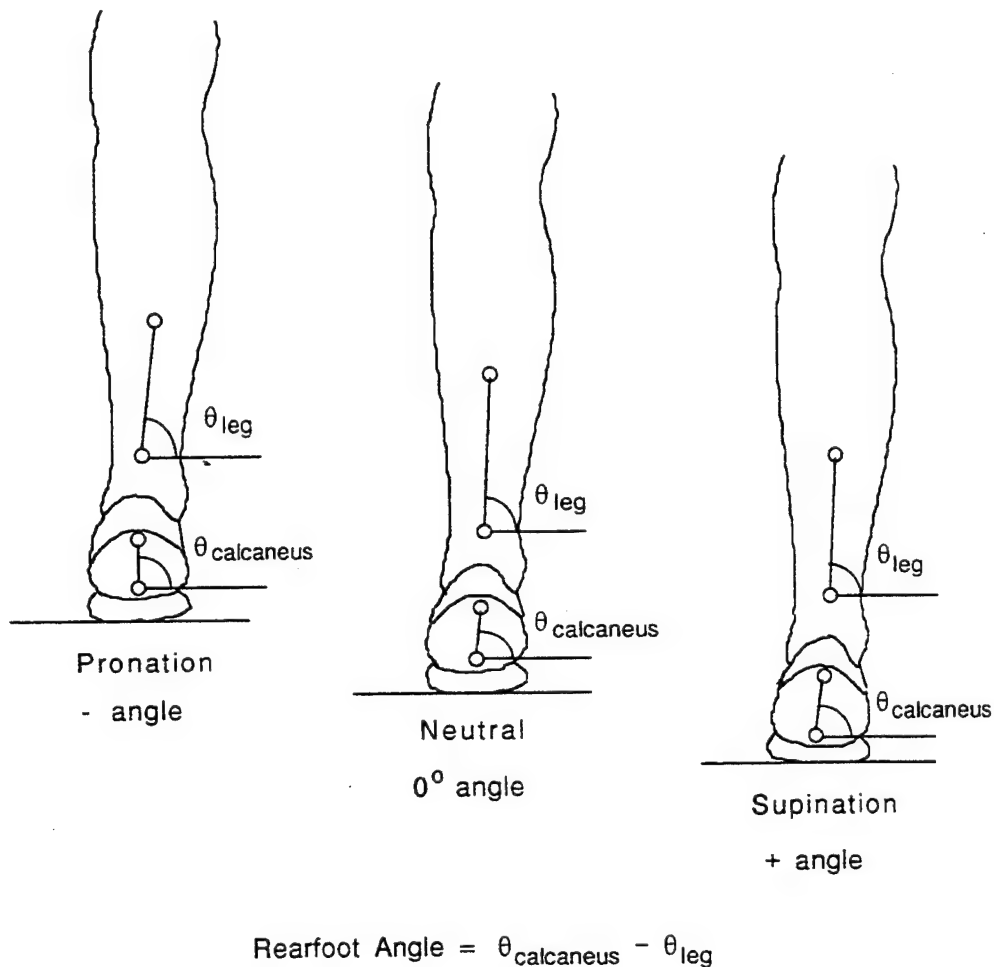


Figure B-5. Marker locations and angle definitions for sagittal plane kinematics during overground walking, marching, and running.

The conventions followed in calculating rearfoot angles are illustrated in Figure B-6. As can be seen, positive angles between the rearfoot and the lower leg indicate a supinated position of the foot and negative angles indicate a pronated position. An angle of  $0^\circ$  represents a neutral position. The parameters used to describe rearfoot movement are illustrated in Figure B-7.



**Figure B-6.** Examples of rearfoot angles during foot contact. The dorsal surface of the right leg is shown.

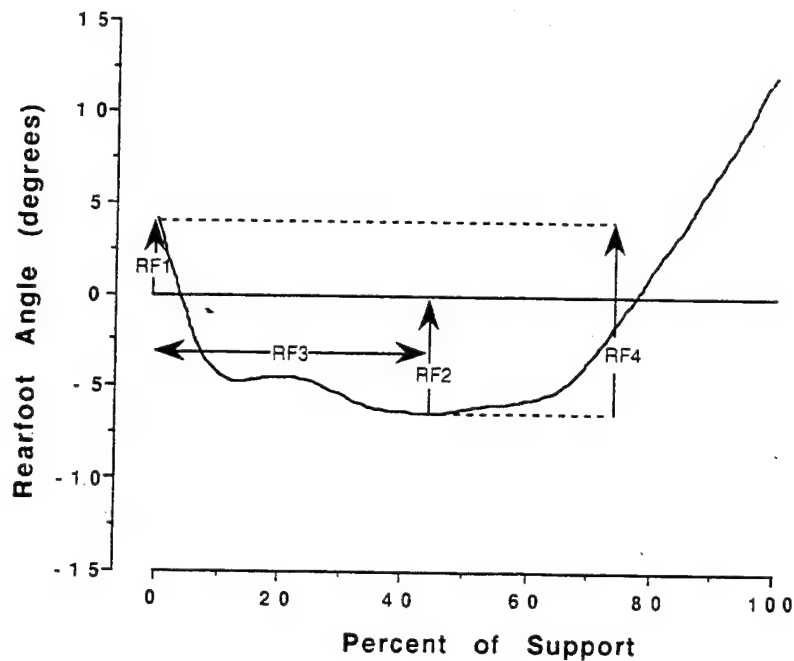


Figure B-7. Graphic representation of a rearfoot angle displacement curve. The parameters are: Rf1 -- rearfoot angle at foot strike; Rf2 -- maximum rearfoot angle; Rf3 -- time to maximum rearfoot angle; Rf4 -- total rearfoot motion.

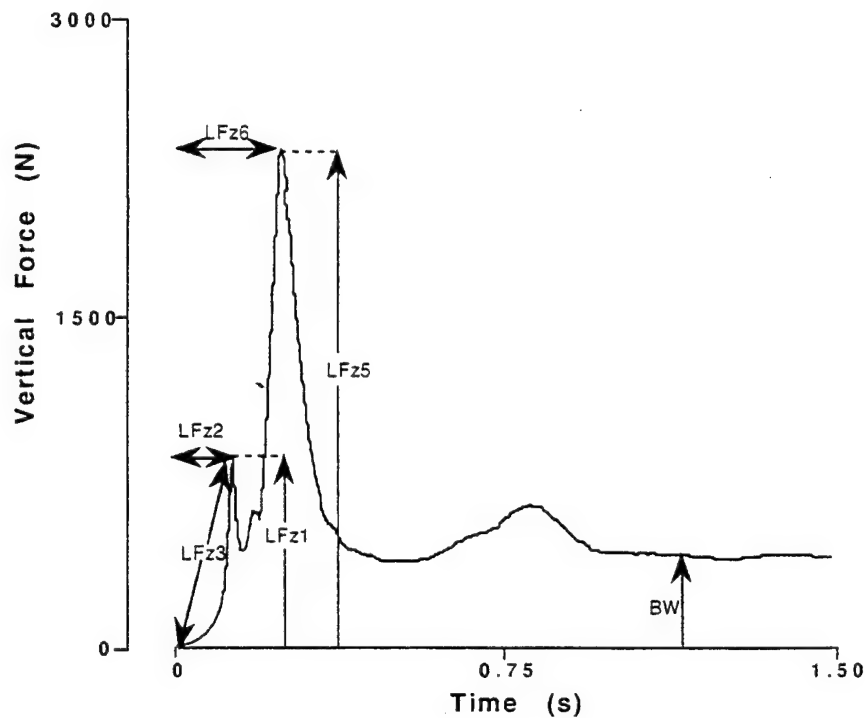
### Jump/Landings

A graphic representation of a vertical ground reaction force-time curve during landing is in Figure B-8. The parameters associated with the vertical force component are illustrated in the figure.

The parameters used to describe in-shoe pressure during jump/landing are the same as those used for the overground locomotor movements. The parameters are illustrated in Figure B-4.

With regard to the sagittal plane kinematics, the marker locations and the conventions used in calculating the joint angles are also the same as those used for the overground locomotor movements, which are illustrated in Figure B-5 and further defined above.

The conventions followed in calculating rearfoot angles are again the same as those applied to the overground locomotion data (Figure B-6), as are the parameters used to describe rearfoot movement (Figure B-7).



*Figure B-8.* Graphic representation of the vertical component of the ground reaction force during landing. The parameters are: LFz1 -- first maximum force; LFz2 -- time to first maximum force; LFz3 -- slope of first maximum force; LFz5 -- second maximum force; LFz6 -- time to second maximum force.



## **APPENDIX C**

### **MEANS AND *F* RATIOS FOR OVERGROUND AND TREADMILL WALKING PARAMETERS**

## KEY FOR ABBREVIATIONS OF VARIABLE NAMES

### *Vertical Ground Reaction Force Component*

- Fz1 -- first maximum force (N/kg of body mass)
- Fz2 -- relative time to first maximum force (%)
- Fz3 -- second maximum force (N/kg of body mass)
- Fz4 -- relative time to second maximum force (%)
- Fz5 -- average vertical force (N/kg of body mass)
- Fz6 -- total vertical impulse (N·s/kg of body mass)

### *Antero-posterior Ground Reaction Force Component*

- Fy1 -- maximum braking force (N/kg of body mass)
- Fy2 -- relative time to maximum braking force (%)
- Fy3 -- relative time to transition force (%)
- Fy4 -- maximum propelling force (N/kg of body mass)
- Fy5 -- relative time to maximum propelling force (%)

### *Medio-lateral Ground Reaction Force Component*

- Fx1 -- force excursions 0-30% of contact period (N/kg of body mass)
- Fx2 -- force excursions 0-100% of contact period (N/kg of body mass)

### *In-shoe Pressure*

- P1 -- peak heel pressure (kPa)
- P2 -- peak forefoot pressure (kPa)
- P3 -- total movement distance of center of pressure (cm)

### *Hip Angle*

- H1 -- maximum flexion (degrees)
- H2 -- maximum extension (degrees)
- H3 -- maximum flexion velocity (degrees/s)
- H4 -- time to maximum flexion velocity (ms)
- H5 -- maximum extension velocity (degrees/s)
- H6 -- time to maximum extension velocity (ms)

### *Knee Angle*

- K1 -- maximum flexion (degrees)
- K2 -- maximum extension (degrees)
- K3 -- maximum flexion velocity (degrees/s)
- K4 -- time to maximum flexion velocity (ms)
- K5 -- maximum extension velocity (degrees/s)
- K6 -- time to maximum extension velocity (ms)

***Ankle Angle***

- A1 -- maximum plantarflexion (degrees)
- A2 -- maximum dorsiflexion (degrees)
- A3 -- maximum plantarflexion velocity (degrees/s)
- A4 -- time to maximum plantarflexion velocity (ms)
- A5 -- maximum dorsiflexion velocity (degrees/s)
- A6 -- time to maximum dorsiflexion velocity (ms)

***Metatarsal Angle***

- Mt1 -- maximum flexion (degrees)
- Mt2 -- time to maximum flexion (ms)
- Mt3 -- maximum flexion velocity (degrees/s)
- Mt4 -- time to maximum flexion velocity (ms)

***Rearfoot Movement***

- Rf1 -- rearfoot angle at foot strike (degrees)
- Rf2 -- maximum rearfoot angle (degrees)
- Rf3 -- time to maximum rearfoot angle (ms)
- Rf4 -- total rearfoot motion (degrees)
- Rf5 -- maximum rearfoot velocity (degrees/s)

***Electromyography***

- EMG1 -- time to onset of muscle activity (ms)
- EMG2 -- time to end of muscle activity (ms)
- EMG3 -- area ( $V \cdot s$ )

***Physiological Parameters***

- M1 -- oxygen uptake (ml/kg of body mass/min)
- M2 -- RER (dimensionless)
- M3 -- heart rate (beats/min)

Table C-1 - Vertical ground reaction force component means and *F* ratios during walking for men (*N* = 15)

Conditions	Variables					
	Fz1	Fz2	Fz3	Fz4	Fz5	Fz6
Fitness						
Low	12.61	22.84	12.85	73.98	9.19	7.57
Medium	12.64	24.03	13.40	75.62	9.47	7.67
High	11.83	26.83	12.42	74.43	8.92	7.07
Shoe						
Combat Boot	12.34 <sup>a</sup>	24.31	13.10 <sup>a</sup>	74.63	9.19	7.44 <sup>a</sup>
Jungle Boot	12.33 <sup>a</sup>	24.39	13.05 <sup>a,b</sup>	74.57	9.13	7.46 <sup>a</sup>
Reebok	12.41 <sup>b</sup>	24.71	12.62 <sup>c</sup>	74.19	9.14	7.44 <sup>a</sup>
Nike CrossTrainer	12.26 <sup>a</sup>	24.13	12.64 <sup>c</sup>	74.12	9.29	7.36 <sup>b</sup>
Rockport	12.23 <sup>a</sup>	24.99	12.90 <sup>b</sup>	75.74	9.21	7.33 <sup>b</sup>
RedWing	12.57 <sup>b</sup>	25.06	13.04 <sup>a,b</sup>	74.81	9.20	7.60 <sup>c</sup>
No Load	10.43X	23.73	10.60X	75.37	7.73X	6.06X
Combat Boot	10.38	23.60	10.81	75.02	7.72	6.08
Jungle Boot	10.37	23.12	10.69	75.36	7.68	6.21
Reebok	10.62	24.10	10.42	75.70	7.68	6.12
Nike CrossTrainer	10.24	23.54	10.34	74.51	7.79	5.94
Rockport	10.36	24.10	10.61	76.38	7.75	5.92
RedWing	10.63	23.89	10.72	75.23	7.75	6.21
50 lb Load	12.76Y	24.76	13.34Y	75.00	9.49Y	7.67Y
Combat Boot	12.72	24.07	13.53	75.29	9.48	7.69
Jungle Boot	12.71	24.62	13.44	74.95	9.41	7.84
Reebok	12.87	24.69	13.09	74.00	9.42	7.67
Nike CrossTrainer	12.69	24.11	13.14	75.08	9.61	7.67
Rockport	12.53	25.35	13.30	75.74	9.52	7.56
RedWing	13.01	25.70	13.50	74.94	9.48	7.77

Table C-1 - (continued)

	Variables					
	Fz1	Fz2	Fz3	Fz4	Fz5	Fz6
70 lb Load	13.98Z	25.32	14.74Z	73.49	10.37Z	8.59Z
Combat Boot	13.95	25.62	14.96	72.57	10.36	8.56
Jungle Boot	13.92	25.43	15.00	73.40	10.32	8.72
Reebok	14.14	25.35	14.35	72.86	10.33	8.55
Nike CrossTrainer	13.85	24.74	14.45	72.77	10.37	8.48
Rockport	13.82	25.51	14.79	75.10	10.38	8.51
RedWing	14.18	25.61	14.90	74.27	10.38	8.81
<u>F ratios</u>						
Fitness	2.07	1.92	6.88	1.06	2.66	2.09
Shoe	11.52*	1.20	24.27*	3.12	2.65	9.26*
Fitness X Shoe	1.52	<1	5.27*	1.02	2.52	1.13
Load	269.75*	3.13	745.87*	2.67	374.28*	360.09*
Fitness X Load	18.67*	4	26.55*	2.76	220.40*	15.69*
Shoe X Load	1.39	1.12	1.09	<1	<1	1.58
Fitness X Shoe X Load	<1	<1	1.45	1.10	<1	1.22

Table C-2 - Vertical ground reaction force component means and *F* ratios during walking for women (*N* = 15).

Conditions	Variables					
	Fz1	Fz2	Fz3	Fz4	Fz5	Fz6
<b>Fitness</b>						
Low	11.65	23.11	12.43	76.64	8.82	6.67
Medium	11.53	24.63	12.22	75.29	8.77	6.86
High	11.76	23.64	12.13	74.77	8.84	6.72
<b>Shoe</b>						
Combat Boot	11.73a	23.52a	12.45a	75.07	8.81	6.81a
Jungle Boot	11.66a	23.70ab	12.37a	75.67	8.80	6.81a
Reebok	11.57a	23.45a	11.97b	75.25	8.79	6.74a
Nike CrossTrainer	11.46a	23.61a	12.08b	75.53	8.83	6.62b
Rockport	11.56a	24.52b	12.20b	76.08	8.79	6.66b
RedWing	11.89b	23.98ab	12.47a	75.78	8.83	6.86a
<b>No Load</b>						
Combat Boot	10.26X	23.81	10.75X	76.10X	7.81X	5.86X
Jungle Boot	10.28	23.54	11.12	75.41	7.91	6.03
Reebok	10.12	23.52	10.82	76.20	7.77	5.87
Nike CrossTrainer	10.06	23.45	10.46	75.92	7.78	5.85
Rockport	10.19	24.01	10.56	76.17	7.80	5.73
RedWing	10.62	24.44	10.67	76.58	7.77	5.77
		23.86	10.90	76.33	7.80	5.90
<b>50 lb Load</b>						
Combat Boot	13.03Y	23.78	13.76Y	75.03Y	9.81Y	7.64Y
Jungle Boot	12.98	23.49	13.89	74.74	9.70	7.59
Reebok	13.03	23.87	13.93	75.14	9.82	7.75
Nike CrossTrainer	13.02	23.44	13.49	74.58	9.81	7.63
Rockport	12.87	23.21	13.60	74.89	9.86	7.52
RedWing	12.93	24.59	13.64	75.58	9.80	7.56
	13.36	24.10	14.04	75.23	9.86	7.82

Table C-2 - (continued)

	Variables					
	Fz1	Fz2	Fz3	Fz4	Fz5	Fz6
<u>F ratios</u>						
Fitness	<1	1.25	<1	<1	<1	<1
Shoe	10.63*	4.02*	20.99*	2.67	1.55	5.43*
Fitness X Shoe	<1	<1	1.08	<1	<1	<1
Load	195.83*	<1	349.52*	20.06*	292.34*	267.43*
Fitness X Load	111.29*	<1	148.84*	9.47*	163.89*	221.75*
Shoe X Load	1.39	<1	<1	1.04	1.01	1.23
Fitness X Load X Shoe	1.60	<1	<1	1.27	1.25	1.52

Table C-3 - Antero-posterior ground reaction force component means and *F* ratios during walking for men (*N* = 15)

Conditions	Variables				
	Fy1	Fy2	Fy3	Fy4	Fy5
<u>Fitness</u>					
Low	-2.21	17.69	50.05	2.31	83.58
Medium	-1.87	19.16	50.05	1.81	84.35
High	-1.74	16.92	55.41	1.96	83.89
<u>Shoe</u>					
Combat Boot	-1.86a	18.53a	52.16	2.03	83.91a b
Jungle Boot	-1.87a	18.34a	50.69	2.06	83.57a
Reebok	-2.00b	17.87a	51.13	2.03	83.88a b
Nike CrossTrainer	-2.05b	16.50b	52.01	2.05	84.20b
Rockport	-1.90ab	17.73a	53.95	1.97	84.20b
RedWing	-1.95ab	18.57a	51.11	2.04	83.87a b
<u>No Load</u>					
Combat Boot	-1.53X	17.38	52.21	1.66X	83.92
Jungle Boot	-1.47	18.17	51.96	1.70	83.74
Reebok	-1.49	17.65	50.70	1.68	83.42
Nike CrossTrainer	-1.57	17.33	51.97	1.65	83.85
Rockport	-1.60	15.99	52.65	1.64	84.04
RedWing	-1.52	17.32	54.62	1.60	84.27
	-1.55	17.84	51.34	1.69	83.83
<u>50 lb Load</u>					
Combat Boot	-1.98Y	18.15	51.77	2.08Y	84.13
Jungle Boot	-1.92	18.71	51.96	2.08	84.17
Reebok	-1.89	18.72	50.68	2.11	83.88
Nike CrossTrainer	-2.01	18.14	51.35	2.07	84.12
Rockport	-2.16	16.69	51.37	2.16	84.20
RedWing	-1.94	17.79	53.92	1.99	84.40
	-1.96	18.87	51.33	2.09	84.02



Table C-3 - (continued)

	Variables				
	Fy1	Fy2	Fy3	Fy4	Fy5
70 lb Load	-2.30Z	18.23	51.54	2.34Z	83.77
Combat Boot	-2.19	18.71	52.54	2.31	83.82
Jungle Boot	-2.24	18.64	50.69	2.38	83.42
Reebok	-2.44	18.15	50.05	2.35	83.69
Nike CrossTrainer	-2.39	16.82	51.99	2.34	84.00
Rockport	-2.25	18.08	53.30	2.33	83.93
RedWing	-2.32	19.00	50.65	2.34	83.74
<u>F ratios</u>					
Fitness	1.75	3.84	2.96	2.39	<1
Shoe	9.02*	9.76*	1.10	<1	4.08*
Fitness X Shoe	1.31	3.36*	1.63	1.50	<1
Load	98.17*	5.50	<1	79.25*	3.87
Fitness X Load	28.40*	4.32*	1.05	19.62*	1.58
Shoe X Load	1.45	<1	<1	<1	1.81
Fitness X Shoe X Load	1.35	<1	<1	<1	1.10

Table C-4 - Antero-posterior ground reaction force component mean values and *F* ratios during walking for women (*N* = 15)

Conditions	Variables				
	Fy1	Fy2	Fy3	Fy4	Fy5
<u>Fitness</u>					
Low	-2.20	17.03	52.89	2.01	83.74
Medium	-1.16	18.59	50.26	1.27	83.37
High	-1.87	17.81	48.74	2.00	84.27
<u>Shoe</u>					
Combat Boot	-1.75	18.19 <sup>a</sup>	50.84	1.73	83.31 <sup>a</sup>
Jungle Boot	-1.70	17.99 <sup>b</sup>	53.06	1.66	83.77 <sup>b</sup>
Reebok	-1.74	17.40 <sup>b</sup>	50.08	1.74	83.65 <sup>a b</sup>
Nike CrossTrainer	-1.77	16.65 <sup>c</sup>	50.05	1.83	84.17 <sup>c</sup>
Rockport	-1.73	17.91 <sup>b</sup>	51.22	1.80	84.12 <sup>c</sup>
RedWing	-1.77	18.71 <sup>a</sup>	48.52	1.80	83.74 <sup>a b</sup>
<u>No Load</u>					
Combat Boot	-1.47 <sup>X</sup>	17.67	50.52	1.53 <sup>X</sup>	83.81
Jungle Boot	-1.50	18.14	51.61	1.47	83.29
Reebok	-1.44	17.72	52.33	1.47	83.80
Nike CrossTrainer	-1.48	16.82	50.10	1.50	83.71
Rockport	-1.45	16.68	50.05	1.60	84.21
RedWing	-1.49	17.61	50.83	1.57	84.11
	-1.48	18.52	48.21	1.56	83.75
<u>30 lb Load</u>					
Combat Boot	-2.01 <sup>Y</sup>	18.04	50.74	1.99 <sup>Y</sup>	83.77
Jungle Boot	-2.01	18.24	50.06	1.99	83.34
Reebok	-1.96	18.27	53.79	1.85	83.74
Nike CrossTrainer	-1.99	17.98	50.06	1.98	83.60
Rockport	-2.08	16.63	50.06	2.07	84.12
RedWing	-1.97	18.21	51.61	2.02	84.13
	-2.04	18.91	48.83	2.03	83.72

Table C-4 - (continued)

	Variables				
	Fy1	Fy2	Fy3	Fy4	Fy5
<u>F ratios</u>					
Fitness	1.96	1.30	1.14	2.06	<1
Shoe	<1	8.93*	1.02	1.28	10.12*
Fitness X Shoe	4.60*	1.41	1.04	2.72	<1
Load	74.73*	7.63	2.54	106.93*	<1
Fitness X Load	61.96*	2.34	<1	79.15*	<1
Shoe X Load	1.25	2.22	<1	<1	<1
Fitness X Shoe X Load	2.21	1.58	<1	<1	1.19

Table C-5 - Medio-lateral ground reaction force component means and *F* ratios during walking for men (*N* = 15)

Variables		
	Fx1	Fx2
<u>Conditions</u>		
Fitness		
Low	1.27	2.74
Medium	0.98	2.50
High	1.24	3.02
Shoe		
Combat Boot	1.16	2.71
Jungle Boot	1.13	2.73
Reebok	1.08	2.66
Nike CrossTrainer	1.28	2.93
Rockport	1.16	2.73
RedWing	1.20	2.78
No Load	1.15	2.55x
Combat Boot	1.15	2.54
Jungle Boot	1.09	2.49
Reebok	1.06	2.45
Nike CrossTrainer	1.25	2.72
Rockport	1.15	2.54
RedWing	1.18	2.59
50 lb Load	1.15	2.76x y
Combat Boot	1.12	2.68
Jungle Boot	1.12	2.75
Reebok	1.07	2.68
Nike CrossTrainer	1.27	2.96
Rockport	1.13	2.71
RedWing	1.20	2.79
70 lb Load	1.21	2.95y
Combat Boot	1.20	2.90
Jungle Boot	1.18	2.94
Reebok	1.12	2.85
Nike CrossTrainer	1.31	3.10
Rockport	1.20	2.94
RedWing	1.23	2.94
<u>F ratios</u>		
Fitness	1.18	<1
Shoe	2.35	1.60
Fitness X Shoe	1.16	<1
Load	1.09	14.41*
Fitness X Load	<1	5.46*
Shoe X Load	<1	<1
Fitness X Shoe X Load	<1	<1

Table C-6 - Medio-lateral ground reaction force component means and *F* ratios during walking for women (*N* = 15)

Variables	Fx2	
	Fx1	
<u>Conditions</u>		
Fitness		
Low	1.18	3.03
Medium	0.72	1.58
High	1.11	2.55
Shoe		
Combat Boot	0.98	2.42
Jungle Boot	1.09	2.47
Reebok	0.88	2.28
Nike CrossTrainer	0.99	2.35
Rockport	0.94	2.24
RedWing	1.13	2.55
No Load	0.97	2.28x
Combat Boot	0.93	2.31
Jungle Boot	1.02	2.21
Reebok	0.87	2.21
Nike CrossTrainer	1.02	2.30
Rockport	0.90	2.10
RedWing	1.07	2.42
50 lb Load	1.03	2.49y
Combat Boot	1.04	2.53
Jungle Boot	1.16	2.60
Reebok	0.89	2.35
Nike CrossTrainer	0.97	2.40
Rockport	0.98	2.37
RedWing	1.19	2.69
<u>F ratios</u>		
Fitness	1.50	2.88
Shoe	1.58	1.75
Fitness X Shoe	1.35	3.16*
Load	3.95	31.99*
Fitness X Load	2.14	10.12*
Shoe X Load	1.18	1.12
Fitness X Shoe X Load	2.02	1.40

Table C-7 - In-shoe pressure parameter means and *F* ratios during walking for men (*N* = 15).

	Variables		
	P1	P2	P3
<u>Conditions</u>			
Fitness			
Low	486.50	520.71	23.32
Medium	534.01	475.69	22.15
High	585.66	433.98	20.85
Shoe			
Combat Boot	617.73	434.42	22.96
Jungle Boot	577.81	487.91	22.01
Reebok	543.44	528.02	23.76
Nike CrossTrainer	446.02	548.31	23.37
Rockport	549.26	481.40	21.61
RedWing	416.19	424.80	19.88
No Load	371.64	386.10	22.22
Combat Boot	465.94	414.54	21.99
Jungle Boot	433.15	402.15	21.92
Reebok	297.28	317.94	25.09
Nike CrossTrainer	323.72	354.38	21.94
Rockport	348.41	325.09	21.40
RedWing	351.79	496.19	20.91
50 lb Load	593.68	554.33	22.26
Combat Boot	611.33	492.92	20.63
Jungle Boot	777.59	617.11	22.38
Reebok	526.11	553.41	22.32
Nike CrossTrainer	499.80	678.11	26.12
Rockport	665.70	537.00	22.02
RedWing	457.90	405.37	19.14
70 lb Load	627.27	518.00	22.40
Combat Boot	774.64	407.51	25.79
Jungle Boot	508.92	433.60	21.66
Reebok	806.93	712.72	23.88
Nike CrossTrainer	501.09	579.99	21.36
Rockport	633.67	582.11	21.42
RedWing	454.99	354.99	19.33
<u>F ratios</u>			
Fitness	<1	1.02	<1
Shoe	<1	1.38	1.24
Fitness X Shoe	<1	<1	<1
Load	2.42	2.14	<1
Fitness X Load	<1	<1	<1
Shoe X Load	2.22	<1	1.26
Fitness X Shoe X Load	1.13	1.21	1.32

Table C-8 - In-shoe pressure parameter means and *F* ratios during walking for women (*N* = 15).

	Variables		
	P1	P2	P3
<u>Conditions</u>			
Fitness			
Low	429.28	455.06	20.13
Medium	431.04	454.45	19.25
High	428.51	453.23	19.87
Shoe			
Combat Boot	491.97	438.90	19.37
Jungle Boot	453.77	498.31	19.92
Reebok	386.49	413.53	19.34
Nike CrossTrainer	316.08	365.84	22.03
Rockport	443.19	524.51	18.97
RedWing	486.33	479.84	19.78
No Load	401.92	472.69	19.94
Combat Boot	477.02	436.35	19.03
Jungle Boot	438.64	518.71	20.07
Reebok	342.53	440.24	19.71
Nike CrossTrainer	335.36	425.53	22.47
Rockport	373.43	506.68	18.59
RedWing	457.05	508.65	19.61
50 lb Load	458.28	434.28	19.90
Combat Boot	510.66	441.45	19.72
Jungle Boot	471.93	477.91	19.74
Reebok	439.24	386.81	18.97
Nike CrossTrainer	292.94	306.15	21.59
Rockport	512.96	542.34	19.31
RedWing	521.46	451.03	19.99
<u>F ratios</u>			
Fitness	<1	1.35	<1
Shoe	<1	3.25	3.25
Fitness X Shoe	<1	1.23	1.11
Load	1.47	1.10	<1
Fitness X Load	<1	<1	<1
Shoe X Load	<1	<1	1.10
Fitness X Shoe X Load	1.21	1.03	1.43

Table C-9 - Hip angle parameter means and *F* ratios during walking for men (*N* = 15)

Conditions	Variables					
	H1	H2	H3	H4	H5	H6
<u>Fitness</u>						
Low	25.58	5.43	144.13	782	154.65	835
Medium	31.27	5.36	151.93	781	166.78	838
High	25.33	4.23	149.63	781	167.38	827
<u>Shoe</u>						
Combat Boot	28.00	5.75	149.43	781 <sup>a</sup> <sub>b</sub>	163.47	837 <sup>a</sup> <sub>b</sub>
Jungle Boot	27.59	6.72	150.33	785 <sup>b</sup>	160.43	833 <sup>a</sup> <sub>b</sub>
Reebok	27.29	5.07	149.85	789 <sup>b</sup>	162.44	835 <sup>a</sup> <sub>b</sub>
Nike CrossTrainer	27.14	4.30	148.16	765 <sup>a</sup>	163.53	817 <sup>b</sup>
Rockport	27.09	3.63	146.90	770 <sup>a</sup>	163.27	825 <sup>b</sup>
RedWing	26.90	4.65	146.52	797 <sup>b</sup>	164.03	858 <sup>a</sup>
<u>No Load</u>						
Combat Boot	16.57 <sup>X</sup>	1.43 <sup>X</sup>	129.16 <sup>X</sup>	758 <sup>X</sup>	142.61 <sup>X</sup>	814 <sup>X</sup>
Jungle Boot	16.31	1.88	128.22	756	142.84	815
Reebok	16.84	2.77	130.12	761	138.88	813
Nike CrossTrainer	17.26	2.25	130.93	768	141.53	810
Rockport	15.56	-0.72	128.34	745	146.27	795
RedWing	16.35	0.84	128.51	742	139.86	795
	17.14	1.68	128.58	776	145.97	852
<u>50 lb Load</u>						
Combat Boot	28.47 <sup>Y</sup>	4.74 <sup>Y</sup>	149.74 <sup>Y</sup>	782 <sup>Y</sup>	167.33 <sup>Y</sup>	841 <sup>Y</sup>
Jungle Boot	30.06	5.09	150.36	767	166.74	840
Reebok	27.84	6.80	151.86	799	165.74	837
Nike CrossTrainer	28.59	5.34	152.01	793	165.99	844
Rockport	28.04	3.33	147.58	769	166.93	830
RedWing	28.72	3.22	149.52	771	168.66	829
	27.16	4.67	146.48	795	170.63	873



Table C-9 - (continued)

	Variables					
	H1	H2	H3	H4	H5	H6
70 lb Load	37.02Z	8.82Z	167.03Z	802Z	178.89Y	847Y
Combat Boot	37.62	9.29	169.38	799	180.84	845
Jungle Boot	38.09	11.59	168.99	815	176.68	849
Reebok	36.01	7.62	166.60	816	179.80	852
Nike CrossTrainer	37.82	9.79	168.55	783	177.40	825
Rockport	36.19	6.52	164.09	780	181.29	820
RedWing	36.48	8.35	164.49	818	177.13	888
<u>F ratios</u>						
Fitness	1.90	<1	<1	<1	<1	<1
Shoe	<1	3.65	<1	10.21*	<1	6.06*
Fitness X Shoe	1.07	<1	<1	<1	<1	<1
Load	86.91*	34.44*	29.25*	78.61*	24.38*	16.06*
Fitness X Load	29.14*	6.79*	14.63*	19.07*	16.32*	8.71*
Shoe X Load	1.12	3.38*	<1	<1	<1	1.35
Fitness X Shoe X Load	1.31	1.54	1.62	1.16	<1	1.25

Table C-10 - Hip angle parameter means and *F* ratios during walking for women (*N* = 15)

Conditions	Variables					
	H1	H2	H3	H4	H5	H6
<u>Fitness</u>						
Low	21.56	-3.23	159.83	735	200.17	789
Medium	19.09	-3.30	120.24	725	175.23	815
High	17.86	-2.85	168.33	735	195.69	782
<u>Shoe</u>						
Combat Boot	20.24	-1.93	156.45	745 <sup>a</sup>	191.17	806
Jungle Boot	20.10	-2.82	152.46	739 <sup>a</sup>	190.40	799
Reebok	19.33	-3.13	148.49	735 <sup>a,b</sup>	190.44	796
Nike CrossTrainer	17.89	-4.24	147.28	707 <sup>b</sup>	191.74	778
Rockport	19.37	-3.12	145.33	727 <sup>a,b</sup>	187.98	790
RedWing	20.31	-3.45	149.30	740 <sup>a</sup>	191.96	803
<u>No Load</u>						
Combat Boot	12.67X	-6.17X	137.70X	714X	186.85	778X
Jungle Boot	13.13	-5.04	144.38	729	187.14	798
Reebok	13.27	-5.50	140.16	728	190.14	773
Nike CrossTrainer	13.01	-6.39	131.57	700	185.36	782
Rockport	11.28	-6.80	135.20	683	185.94	762
RedWing	12.71	-6.37	134.94	716	183.00	773
	12.68	-7.04	139.46	729	189.68	782
<u>50 lb Load</u>						
Combat Boot	26.25Y	-0.08Y	161.75Y	750Y	194.27	812Y
Jungle Boot	28.23	1.57	170.03	768	195.71	816
Reebok	26.93	0.21	164.76	765	190.65	824
Nike CrossTrainer	24.95	-0.23	163.53	749	194.96	809
Rockport	24.50	-1.67	159.36	721	197.53	794
RedWing	26.03	0.13	155.72	738	192.96	807
	27.08	-0.27	158.05	759	193.99	822

Table C-10 - (continued)

<u>F ratios</u>	Variables					
	H1	H2	H3	H4	H5	H6
Fitness	<1	<1	<1	<1	<1	1.24
Shoe	1.75	1.38	<1	3.92*	<1	2.51
Fitness X Shoe	<1	<1	<1	<1	<1	<1
Load	23.29*	35.43*	32.38*	50.43*	<1	11.79*
Fitness X Load	49.62*	26.76*	4.47	21.61*	<1	8.57*
Shoe X Load	1.11	<1	<1	<1	<1	1.83
Fitness X Shoe X Load	1.80	<1	1.18	<1	<1	1.43

Table C-11 - Knee angle parameter means and *F* ratios during walking for men (*N* = 15)

Conditions	Variables					
	K1	K2	K3	K4	K5	K6
<u>Fitness</u>						
Low	45.95	1.06	287.26	749	231.88	802
Medium	42.97	2.06	304.29	760	263.92	801
High	47.55	3.59	308.20	757	270.18	795
<u>Shoe</u>						
Combat Boot	46.80 <sup>a</sup> <sub>b</sub>	1.89	308.15 <sup>a</sup>	757 <sup>a</sup>	263.81	800 <sup>a</sup>
Jungle Boot	48.20 <sup>a</sup>	2.43	304.66 <sup>a</sup>	756 <sup>a</sup>	255.73	802 <sup>a</sup>
Reebok	46.96 <sup>a</sup> <sub>b</sub>	2.36	299.33 <sup>a</sup> <sub>b</sub>	760 <sup>a</sup>	250.88	805 <sup>a</sup>
Nike CrossTrainer	44.65 <sup>b</sup>	2.78	290.66 <sup>b</sup>	743 <sup>b</sup>	251.05	782 <sup>b</sup>
Rockport	44.23 <sup>b</sup>	2.19	292.96 <sup>b</sup>	747 <sup>b</sup>	255.01	790 <sup>b</sup>
RedWing	46.58 <sup>a</sup> <sub>b</sub>	1.78	304.10 <sup>a</sup>	770 <sup>a</sup>	254.77	817 <sup>a</sup>
<u>No Load</u>	45.95	0.90 <sup>x</sup>	289.17 <sup>x</sup>	737 <sup>x</sup>	251.52	777 <sup>x</sup>
Combat Boot	45.81	0.31	294.99	738	259.24	779
Jungle Boot	47.95	0.31	293.42	739	250.43	783
Reebok	47.29	1.52	289.27	742	248.02	783
Nike CrossTrainer	43.01	1.57	277.21	726	248.66	760
Rockport	43.93	1.53	284.25	722	251.51	760
RedWing	46.89	0.21	296.26	755	251.15	798
<u>50 lb Load</u>	46.06	1.45 <sup>x</sup>	302.32 <sup>y</sup>	759 <sup>y</sup>	255.68	803 <sup>y</sup>
Combat Boot	47.41	1.23	312.90	764	265.19	806
Jungle Boot	47.48	1.02	305.01	759	256.52	804
Reebok	46.74	1.78	303.58	766	251.21	809
Nike CrossTrainer	44.32	1.69	296.00	746	248.51	789
Rockport	44.16	1.54	295.17	749	256.52	793
RedWing	46.44	1.37	301.24	772	256.39	818

Table C-11 - (continued)

	Variables					
	K1	K2	K3	K4	K5	K6
70 lb Load	46.60	4.34Y	308.16Y	770Z	258.44	818Z
Combat Boot	47.19	4.13	316.56	779	266.99	816
Jungle Boot	49.16	4.96	315.54	781	260.25	827
Reebok	46.85	4.07	305.16	772	253.41	825
Nike CrossTrainer	45.63	5.18	298.76	756	255.99	798
Rockport	44.60	4.10	299.48	750	256.99	806
RedWing	46.36	3.66	314.09	784	257.16	835
<u>F ratios</u>						
Fitness	<1	<1	1.97	<1	6.13	<1
Shoe	5.99*	1.23	12.19*	7.60*	2.09	8.65*
Fitness X Shoe	<1	<1	1.40	<1	2.60	<1
Load	<1	54.73*	12.27*	57.58*	1.34	76.46*
Fitness X Load	1.10	<1	1.84	<1	1.09	<1
Shoe X Load	2.04	1.26	1.03	<1	<1	<1
Fitness X Shoe X Load	2.13	<1	2.44	1.93	1.31	2.45

Table C-12 - Knee angle parameter means and *F* ratios during walking for women (*N* = 15)

Conditions	Variables					
	K1	K2	K3	K4	K5	K6
<u>Fitness</u>						
Low	42.54	-4.03	293.41	702	252.54	757
Medium	41.32	-0.75	277.12	721	255.38	753
High	45.44	-1.54	289.32	700	242.00	748
<u>Shoe</u>						
Combat Boot	44.94 <sub>a</sub>	-2.16	294.14 <sub>a b</sub>	717	251.23 <sub>a b</sub>	765
Jungle Boot	43.69 <sub>a b</sub>	-1.93	300.83 <sub>a</sub>	715	261.37 <sub>a</sub>	753
Reebok	43.17 <sub>a b</sub>	-1.91	283.17 <sub>b</sub>	707	240.38 <sub>b</sub>	748
Nike CrossTrainer	42.09 <sub>a b</sub>	-2.37	280.97 <sub>b</sub>	692	246.38 <sub>a b</sub>	737
Rockport	42.03 <sub>b</sub>	-1.77	276.36 <sub>c</sub>	708	248.72 <sub>a b</sub>	758
RedWing	42.65 <sub>a b</sub>	-2.58	285.29 <sub>b</sub>	708	251.20 <sub>a b</sub>	757
<u>No Load</u>						
Combat Boot	42.34	-3.39 <sub>X</sub>	280.20 <sub>X</sub>	694 <sub>X</sub>	252.76	738 <sub>X</sub>
Jungle Boot	43.82	-3.72	288.57	706	254.73	754
Reebok	43.53	-3.22	296.83	697	266.10	732
Nike CrossTrainer	41.95	-3.80	279.47	696	238.00	733
Rockport	41.13	-3.40	263.27	686	250.07	720
RedWing	41.64	-2.88	271.16	700	250.05	753
	42.88	-3.40	280.77	680	254.10	735
<u>50 lb Load</u>						
Combat Boot	43.81	-0.85 <sub>Y</sub>	293.22 <sub>Y</sub>	721 <sub>Y</sub>	247.18	767 <sub>Y</sub>
Jungle Boot	46.18	-0.40	300.41	729	247.30	777
Reebok	44.86	-0.47	304.84	734	256.63	773
Nike CrossTrainer	44.26	-0.25	295.34	717	242.49	761
Rockport	43.06	-1.34	288.66	697	240.69	754
RedWing	42.42	-0.67	281.56	717	247.38	763
	43.33	-1.85	289.31	732	249.63	776

Table C-12 - (continued)

	Variables					
	K1	K2	K3	K4	K5	K6
<i>F</i> ratios						
Fitness	<1	<1	1.09	<1	<1	<1
Shoe	4.57*	1.30	7.53*	2.02	4.82*	3.02
Fitness X Shoe	<1	<1	<1	<1	<1	<1
Load	3.41	21.82*	37.74*	56.91*	2.72	31.83*
Fitness X Load	2.84	9.13*	9.23*	28.95*	<1	6.70
Shoe X Load	1.90	<1	1.22	3.34	<1	1.43
Fitness X Shoe X Load	1.17	1.31	2.12	1.36	1.34	1.25

Table C-13 - Ankle angle parameter means and *F* ratios during walking for men (*N* = 15)

Conditions	Variables					
	A1	A2	A3	A4	A5	A6
Fitness						
Low	21.55	-10.43	275.63	745	-89.59	190
Medium	17.10	-11.14	273.87	754	-100.97	192
High	16.97	-11.18	251.08	739	-94.26	161
Shoe						
Combat Boot	18.51 <sup>a</sup>	-10.26 <sup>a</sup>	240.82 <sup>a</sup>	733	-97.70 <sup>a</sup>	180
Jungle Boot	21.23 <sup>a</sup>	-9.93 <sup>a</sup>	256.35 <sup>a</sup>	747	-98.71 <sup>a</sup>	169
Reebok	14.65 <sup>b</sup>	-14.23 <sup>b</sup>	270.83 <sup>b</sup>	760	-89.95 <sup>b</sup>	192
Nike CrossTrainer	18.87 <sup>a</sup>	-10.86 <sup>a</sup>	297.02 <sup>b</sup>	744	-89.51 <sup>b</sup>	188
Rockport	18.15 <sup>a</sup>	-11.82 <sup>a</sup>	287.26 <sup>b</sup>	743	-95.78 <sup>a</sup>	179
RedWing	20.31 <sup>a</sup>	-8.05 <sup>c</sup>	245.67 <sup>a</sup>	749	-98.06 <sup>a</sup>	174
No Load	17.72 <sup>X</sup>	-9.74 <sup>X</sup>	251.63 <sup>X</sup>	727 <sup>X</sup>	-91.29 <sup>X</sup>	189
Combat Boot	17.31	-9.27	222.69	724	-92.55	188
Jungle Boot	20.12	-8.62	241.21	733	-95.75	168
Reebok	14.28	-13.06	258.13	745	-85.22	223
Nike CrossTrainer	17.74	-9.83	283.00	725	-85.64	198
Rockport	17.29	-10.71	273.12	718	-93.74	170
RedWing	19.78	-6.83	230.77	715	-95.24	187
50 lb Load	18.39 <sup>X</sup> Y	-11.20 <sup>Y</sup>	270.01 <sup>Y</sup>	751 <sup>Y</sup>	-96.45 <sup>Y</sup>	177
Combat Boot	18.72	-10.44	245.60	735	-100.74	176
Jungle Boot	21.41	-10.37	259.88	751	-99.69	169
Reebok	14.41	-14.32	272.53	760	-91.57	174
Nike CrossTrainer	18.65	-11.01	297.51	751	-91.60	183
Rockport	17.78	-11.66	287.58	747	-95.85	180
RedWing	20.01	-8.69	251.51	766	-100.51	178



Table C-13 - (continued)

	Variables					
	A1	A2	A3	A4	A5	A6
70 lb Load	19.57Y	-11.82Z	278.78Z	760Y	-96.89Y	176
Combat Boot	19.51	-11.06	254.17	739	-99.81	177
Jungle Boot	22.17	-10.80	267.95	758	-100.68	170
Reebok	15.26	-15.31	281.85	776	-93.07	180
Nike CrossTrainer	20.21	-11.75	310.53	754	-91.27	184
Rockport	19.39	-13.10	301.08	764	-97.77	187
RedWing	21.07	-8.79	256.19	770	-99.04	157
<u>F ratios</u>						
Fitness	1.22	<1	3.81	<1	<1	<1
Shoe	8.99*	27.80*	32.52*	1.15	7.03*	<1
Fitness X Shoe	2.15	<1	3.44*	<1	1.50	<1
Load	12.47*	90.55*	61.09*	16.87*	9.32*	4.73
Fitness X Load	6.62*	10.76*	20.64*	7.66*	3.78	1.01
Shoe X Load	1.03	<1	<1	1.12	<1	1.04
Fitness X Shoe X Load	1.03	1.02	1.08	<1	<1	1.16

Table C-14 - Ankle angle parameter means and *F* ratios during walking for women (*N* = 15)

Conditions	Variables					
	A1	A2	A3	A4	A5	A6
<u>Fitness</u>						
Low	17.49	-10.50	271.18	697	-101.75	167
Medium	14.11	-12.19	253.15	704	-105.17	164
High	23.68	-8.82	288.25	690	-100.45	163
<u>Shoe</u>						
Combat Boot	18.58a	-9.47ab	237.65a	696	-108.56	150a
Jungle Boot	20.36a	-9.40ab	250.43ab	693	-103.57	165ab
Reebok	13.91b	-13.78c	277.54bcd	708	-100.06	170ab
Nike CrossTrainer	19.04a	-10.27ab	299.79d	686	-95.97	148a
Rockport	18.92a	-11.19b	295.56cd	692	-100.38	189b
RedWing	19.76a	-8.85a	263.29abc	708	-106.43	164ab
<u>No Load</u>						
Combat Boot	17.66X	-10.01X	265.19	685X	-99.24	167
Jungle Boot	17.51	-9.19	228.71	686	-105.17	151
Reebok	19.64	-8.88	243.57	675	-97.95	163
Nike CrossTrainer	13.51	-13.07	281.81	697	-96.67	178
Rockport	17.91	-10.06	290.85	676	-91.77	158
RedWing	18.03	-10.90	292.32	686	-100.92	192
	19.06	-8.12	254.56	691	-103.11	162
<u>50 lb Load</u>						
Combat Boot	19.24Y	-10.95Y	276.76	709Y	-105.54	162
Jungle Boot	19.78	-9.79	247.71	708	-112.36	148
Reebok	21.08	-9.91	257.28	712	-109.18	168
Nike CrossTrainer	14.26	-14.41	273.74	719	-103.07	163
Rockport	20.17	-10.48	308.74	698	-100.17	139
RedWing	19.82	-11.48	298.81	699	-99.83	186
	20.38	-9.50	271.05	723	-109.38	166

Table C-14 - (continued)

	Variables					
	A1	A2	A3	A4	A5	A6
<u>F ratios</u>						
Fitness	8.16	1.48	1.86	<1	<1	<1
Shoe	11.18*	23.50*	15.60*	1.52	2.74	6.77*
Fitness X Shoe	5.93*	2.93	3.02	<1	<1	1.35
Load	12.94*	32.18*	2.60	174.70*	6.13	<1
Fitness X Load	9.09*	6.01	2.24	<1	6.46	<1
Shoe X Load	2.90	<1	2.63	1.03	1.80	<1
Fitness X Shoe X Load	1.18	1.29	1.15	<1	1.30	<1

Table C-15 - Metatarsal joint angle parameter means and *F* ratios during walking for men (*N* = 15)

Conditions	Variables			
	Mt1	Mt2	Mt3	Mt4
<u>Fitness</u>				
Low	33.93	721	259.56	769
Medium	33.79	732	239.32	772
High	36.24	719	263.67	768
<u>Shoe</u>				
Combat Boot	39.67a	724a	318.54a	774a
Jungle Boot	40.02a	729a	304.26a	775a
Reebok	29.17b	722a	255.47b	770a
Nike CrossTrainer	32.12b	715b	231.67b	754b
Rockport	31.94b	719b	219.25b c	762a b
RedWing	35.59c	737a	196.52c	782c
<u>No Load</u>				
Combat Boot	33.59X	703X	230.42X	748X
Jungle Boot	38.33	704	293.20	754
Reebok	39.32	711	282.50	758
Nike CrossTrainer	27.86	700	229.77	750
Rockport	30.81	692	202.59	737
RedWing	30.93	691	195.79	744
	34.78	718	183.01	756
<u>50 lb Load</u>				
Combat Boot	34.87Y	729Y	260.36Y	774Y
Jungle Boot	40.03	731	321.84	780
Reebok	39.77	733	310.65	789
Nike CrossTrainer	29.56	730	264.22	778
Rockport	32.56	723	234.33	756
RedWing	32.21	723	219.01	767
	35.72	738	201.59	788

Table C-15 - (continued)

	Variables			
	Mt1	Mt2	Mt3	Mt4
70 lb Load	35.54Y	741Z	272.66Y	786Y
Combat Boot	40.65	748	340.57	790
Jungle Boot	40.98	743	319.62	799
Reebok	30.08	745	272.43	797
Nike CrossTrainer	32.99	729	258.06	771
Rockport	32.67	723	242.95	775
RedWing	36.30	755	206.23	803
<u>F ratios</u>				
Fitness	1.17	<1	<1	<1
Shoe	48.07*	5.27*	40.82*	4.86*
Fitness X Shoe	8.17*	<1	5.96*	<1
Load	31.46*	82.93*	34.20*	44.34*
Fitness X Load	18.07*	23.96*	19.90*	18.73*
Shoe X Load	<1	1.00	3.58*	<1
Fitness X Shoe X Load	1.26	1.31	2.05	1.16

Table C-16 - Metatarsal joint angle parameter means and *F* ratios during walking for women (*N* = 15)

Conditions	Variables			
	Mt1	Mt2	Mt3	Mt4
<u>Fitness</u>				
Low	29.26	670	204.72	712
Medium	31.74	685	199.75	666
High	32.81	664	272.11	708
<u>Shoe</u>				
Combat Boot	34.46a	678	267.02ab	725
Jungle Boot	38.85a	682	297.48a	712
Reebok	24.79b	670	220.46bc	711
Nike CrossTrainer	26.26b	660	206.57bc	644
Rockport	28.82b	671	187.46c	681
RedWing	34.28a	679	173.59c	702
<u>No Load</u>				
Combat Boot	30.25X	659X	207.54X	673X
Jungle Boot	33.29	664	240.88	711
Reebok	37.88	663	280.48	682
Nike CrossTrainer	22.99	657	196.30	697
Rockport	25.36	649	188.78	630
RedWing	28.60	659	178.39	653
	32.87	659	153.08	669
<u>50 lb Load</u>				
Combat Boot	32.23Y	688Y	243.27Y	717Y
Jungle Boot	35.79	694	396.42	742
Reebok	39.82	701	314.48	743
Nike CrossTrainer	26.40	681	241.95	723
Rockport	27.18	671	224.35	658
RedWing	29.04	682	196.53	710
	35.53	697	191.82	731

Table C-16 - (continued)

	Variables			
	Mt1	Mt2	Mt3	Mt4
<u>F ratios</u>				
Fitness	<1	<1	1.04	<1
Shoe	23.43*	1.93	8.94*	2.05
Fitness X Shoe	5.32*	<1	2.02	<1
Load	197.13*	120.72*	17.67*	29.08*
Fitness X Load	13.35*	13.73*	9.52*	6.40
Shoe X Load	1.82	<1	1.42	1.89
Fitness X Shoe X Load	1.83	<1	1.70	1.22

Table C-17 - Rearfoot movement parameter means and *F* ratios during walking for men (*N*=15)

Conditions	Variables				
	Rf1	Rf2	Rf3	Rf4	Rf5
Fitness					
Low	1.57	-5.64	141	7.06	-202.07
Medium	0.02	-7.94	122	7.95	-195.88
High	3.96	-2.77	163	6.80	-150.00
Shoe					
Combat Boot	1.03a	-6.47	136ab	7.45	-182.76
Jungle Boot	0.50a	-6.37	129b	6.86	-187.27
Reebok	2.13b	-5.35	151a	7.46	-164.57
Nike CrossTrainer	4.29c	-3.28	146ab	7.45	-203.90
Rockport	0.32a	-7.22	138ab	7.59	-198.66
RedWing	2.81b	-4.03	153a	6.81	-158.00
No Load	1.77	-5.39	133X	7.10	-181.57
Combat Boot	0.63	-6.54	130	7.12	-169.62
Jungle Boot	0.43	-6.46	119	6.68	-192.17
Reebok	1.66	-5.01	148	6.64	-162.29
Nike CrossTrainer	4.28	-2.99	129	7.19	-203.64
Rockport	0.23	-7.32	129	7.50	-208.48
RedWing	3.29	-4.19	141	7.49	-155.47
50 lb Load	2.10	-5.24	146Y	7.33	-183.25
Combat Boot	1.56	-6.36	140	7.90	-188.10
Jungle Boot	1.01	-6.18	138	7.43	-186.31
Reebok	2.56	-4.93	156	7.51	-163.97
Nike CrossTrainer	4.55	-3.37	146	7.79	-210.63
Rockport	0.61	-6.92	142	7.43	-194.68
RedWing	2.34	-3.84	158	5.83	-151.60



Table C-17 - (continued)

	Variables				
	Rf1	Rf2	Rf3	Rf4	Rf5
70 lb Load	1.68	-5.71	146Y	7.38	-183.12
Combat Boot	0.90	-6.49	139	7.33	-190.55
Jungle Boot	0.70	-6.47	121	6.47	-183.33
Reebok	2.20	-6.07	161	8.23	-167.39
Nike CrossTrainer	4.03	-3.41	153	7.35	-197.43
Rockport	0.11	-7.44	143	7.83	-193.64
RedWing	2.77	-4.36	159	7.05	-166.40
<u>F-ratios</u>					
Fitness	1.17	3.47	2.88	<1	1.37
Shoe	3.81*	3.06	3.90*	2.10	1.42
Fitness X Shoe	1.28	1.91	1.95	<1	1.24
Load	<1	<1	5.82*	<1	<1
Fitness X Load	1.38	1.91	2.41	<1	1.26
Shoe X Load	1.08	<1	<1	1.76	<1
Fitness X Shoe X Load	1.69	<1	1.17	1.81	<1

Table C-18 - Rearfoot movement parameter means and *F* ratios during walking for women (*N* = 15)

Conditions	Variables				
	Rf1	Rf2	Rf3	Rf4	Rf5
<u>Fitness</u>					
Low	0.70	-6.00	144	6.75	-178.58
Medium	2.77	-5.27	159	8.01	-182.81
High	2.89	-4.31	152	7.18	-124.12
<u>Shoe</u>					
Combat Boot	1.25	-5.29a	154	6.75a	-123.21a
Jungle Boot	2.17	-4.77a	155	6.93a	-160.32b
Reebok	2.44	-5.46a	145	7.68b	-165.14b
Nike CrossTrainer	3.78	-4.10a	148	7.86b	-187.51c
Rockport	0.41	-7.66b	150	8.14b	-187.40c
RedWing	2.81	-3.77a	158	6.53a	-147.90a
<u>No Load</u>					
Combat Boot	1.97	-5.06	151	7.03	-164.2
Jungle Boot	1.23	-5.07	156	6.18	-116.00
Reebok	2.20	-4.37	154	6.55	-165.20
Nike CrossTrainer	2.19	-5.07	146	7.17	-166.2
Rockport	3.78	-4.14	151	7.90	-190.3
RedWing	0.36	-7.61	148	8.01	-194.0
	2.22	-3.92	151	6.31	-151.0
<u>50 lb Load</u>					
Combat Boot	2.31	-5.32	153	7.63	-160.0
Jungle Boot	1.26	-5.48	152	7.33	-129.60
Reebok	2.13	-5.17	156	7.32	-155.40
Nike CrossTrainer	2.72	-5.84	144	8.24	-164.0
Rockport	3.78	-4.06	145	7.82	-185.1
RedWing	0.46	-7.71	152	8.27	-180.9
	3.40	-3.62	165	6.76	-144.8

Table C-18 - (continued)

	Variables				
	Rf1	Rf2	Rf3	Rf4	Rf5
<i>F</i> ratios					
Fitness	<1	<1	<1	<1	2.90
Shoe	1.21	5.22*	<1	3.63*	7.64*
Fitness X Shoe	<1	<1	<1	1.01	<1
Load	2.07	1.35	2.37	2.24	<1
Fitness X Load	1.21	1.03	1.43	1.11	1.05
Shoe X Load	<1	1.90	1.14	<1	2.01
Fitness X Shoe X Load	<1	<1	<1	1.23	<1

Appendix C

Table C-19 - Medial Hamstring parameter means and *F* ratios during walking for men (*N* = 15)

	EMG1	Variables EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	-192.7	3.5	0.0098
Medium	-206.3	2.5	0.0123
High	-219.7	57.5	0.0156
Shoe			
Combat Boot	-217.1 <sub>a</sub>	13.1	0.0125
Jungle Boot	-201.3 <sub>b</sub>	37.7	0.0130
Reebok	-208.2 <sub>a</sub>	14.3	0.0120
Nike CrossTrainer	-192.1 <sub>b</sub>	25.7	0.0126
Rockport	-200.7 <sub>b</sub>	18.2	0.0120
RedWing	-219.6 <sub>a</sub>	21.3	0.0135
No Load	-206.0	31.4	0.0136
Combat Boot	-218.7	22.5	0.0115
Jungle Boot	-189.7	59.8	0.0143
Reebok	-215.1	20.3	0.0143
Nike CrossTrainer	-196.9	31.9	0.0147
Rockport	-203.9	16.7	0.0126
RedWing	-211.8	36.0	0.0143
50 lb Load	-207.8	20.4	0.0127
Combat Boot	-207.1	35.7	0.0139
Jungle Boot	-215.1	24.7	0.0132
Reebok	-200.0	3.5	0.0114
Nike CrossTrainer	-193.1	24.6	0.0118
Rockport	-199.1	16.6	0.0122
RedWing	-222.9	19.0	0.0137
70 lb Load	-205.3	13.1	0.0114
Combat Boot	-224.8	-16.9	0.0121
Jungle Boot	-200.3	27.5	0.0116
Reebok	-198.7	19.6	0.0101
Nike CrossTrainer	-186.2	20.6	0.0113
Rockport	-199.5	21.4	0.0112
RedWing	-224.9	36.0	0.0125
<u>F ratios</u>			
Fitness	<1	<1	1.71
Shoe	14.77*	1.98	<1
Fitness X Shoe	1.37	<1	1.71
Load	<1	<1	1.80
Fitness X Load	<1	1.50	1.79
Shoe X Load	1.14	<1	<1
Fitness X Shoe X Load	1.21	1.27	1.40

Table C-20 - Medial Hamstring parameter means and *F* ratios  
during walking for women (*N* = 15)

	Variables		
	EMG1	EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	-203.8	-24.0	0.0089
Medium	-160.0	74.4	0.0112
High	-198.5	35.6	0.0098
Shoe			
Combat Boot	-213.1	-13.4	0.0093
Jungle Boot	-170.9	32.7	0.0095
Reebok	-206.3	11.6	0.0097
Nike CrossTrainer	-173.0	33.1	0.0087
Rockport	-170.1	60.2	0.0095
RedWing	-191.1	47.9	0.0134
No Load	-194.7	20.1	0.0094
Combat Boot	-204.4	6.5	0.0088
Jungle Boot	-182.8	8.8	0.0074
Reebok	-198.4	21.4	0.0097
Nike CrossTrainer	-187.3	13.2	0.0077
Rockport	-185.6	60.2	0.0101
RedWing	-209.6	23.6	0.0128
50 lb Load	-180.2	37.2	0.0106
Combat Boot	-221.8	20.3	0.0098
Jungle Boot	-159.1	56.6	0.0116
Reebok	-214.2	1.7	0.0098
Nike CrossTrainer	-158.7	52.9	0.0098
Rockport	-154.6	60.2	0.0086
RedWing	-172.7	72.3	0.0140
<u><i>F</i> ratios</u>			
Fitness	<1	1.20	<1
Shoe	1.74	2.79	2.33
Fitness X Shoe	<1	<1	<1
Load	<1	<1	<1
Fitness X Load	<1	2.15	1.77
Shoe X Load	1.00	<1	2.18
Fitness X Shoe X Load	1.00	1.13	1.39

Appendix C

Table C-21 - Rectus Femoris parameter means and *F* ratios during walking for men (*N* = 15)

	Variables		
	EMG1	EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	-32.4	194.7	0.0282
Medium	-11.5	182.0	0.0172
High	-34.2	155.0	0.0189
Shoe			
Combat Boot	-32.8	170.8	0.0209
Jungle Boot	-20.5	183.2	0.0191
Reebok	-38.3	172.6	0.0228
Nike CrossTrainer	-30.3	174.8	0.0213
Rockport	-14.9	181.9	0.0193
RedWing	-20.8	179.0	0.0253
No Load	-30.8	152.2 $\mathbf{X}$	0.0155 $\mathbf{X}$
Combat Boot	-33.5	159.1	0.0163
Jungle Boot	-29.7	163.8	0.0179
Reebok	-50.8	138.3	0.0174
Nike CrossTrainer	-38.2	143.7	0.0157
Rockport	-16.8	152.3	0.0126
RedWing	-16.0	156.8	0.0133
50 lb Load	-27.0	170.7 $\mathbf{XY}$	0.0196 $\mathbf{X}$
Combat Boot	-30.5	168.5	0.0215
Jungle Boot	-26.0	167.3	0.0142
Reebok	-41.0	162.0	0.0192
Nike CrossTrainer	-36.4	163.8	0.0214
Rockport	-12.5	184.3	0.0205
RedWing	-20.3	177.9	0.0204
70 lb Load	-20.5	208.8 $\mathbf{Y}$	0.0293 $\mathbf{Y}$
Combat Boot	-34.2	183.7	0.0245
Jungle Boot	-17.8	217.2	0.0247
Reebok	-19.9	226.4	0.0337
Nike CrossTrainer	-19.3	216.9	0.0268
Rockport	-15.4	209.0	0.0247
RedWing	-26.1	202.3	0.0421
<u>F ratios</u>			
Fitness	<1	<1	<1
Shoe	3.05	<1	1.38
Fitness X Shoe	<1	<1	<1
Load	2.19	10.06*	21.03*
Fitness X Load	1.61	6.37*	7.35*
Shoe X Load	<1	<1	1.62
Fitness X Shoe X Load	1.15	<1	1.22

Table C-22 - Rectus Femoris parameter means and *F* ratios during walking for women (*N* = 15)

	EMG1	Variables EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	-45.6	123.1	0.0194
Medium	-49.6	134.0	0.0205
High	-61.2	135.5	0.0178
Shoe			
Combat Boot	-58.3	118.9 <sub>a</sub>	0.0193
Jungle Boot	-37.4	136.8 <sub>ab</sub>	0.0199
Reebok	-56.0	124.6 <sub>ab</sub>	0.0188
Nike CrossTrainer	-56.2	132.4 <sub>ab</sub>	0.0197
Rockport	-50.0	142.7 <sub>b</sub>	0.0196
RedWing	-54.5	130.4 <sub>ab</sub>	0.0182
No Load	-48.1	128.4	0.0192
Combat Boot	-55.2	114.8	0.0200
Jungle Boot	-31.8	137.7	0.0171
Reebok	-50.2	119.4	0.0214
Nike CrossTrainer	-47.0	129.3	0.0203
Rockport	-49.9	145.2	0.0203
RedWing	-54.7	123.9	0.0158
50 lb Load	-56.3	133.5	0.0193
Combat Boot	-61.3	123.0	0.0186
Jungle Boot	-43.6	135.9	0.0230
Reebok	-61.8	129.8	0.0162
Nike CrossTrainer	-65.3	135.6	0.0191
Rockport	-50.1	140.1	0.0189
RedWing	-54.4	136.9	0.0206
<u><i>F</i> ratios</u>			
Fitness	<1	<1	<1
Shoe	1.47	3.37*	<1
Fitness X Shoe	<1	<1	<1
Load	<1	1.30	<1
Fitness X Load	<1	8.45*	<1
Shoe X Load	<1	<1	<1
Fitness X Shoe X Load	<1	<1	<1

Appendix C

Table C-23 - Anterior Tibialis parameter means and *F* ratios during walking for men (*N* = 15)

	Variables		
	EMG1	EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	-294.7	72.2	0.0382
Medium	-430.1	90.9	0.0365
High	-49.6	91.0	0.0467
Shoe			
Combat Boot	-369.4	72.6 <sub>a</sub>	0.0399
Jungle Boot	-366.4	82.0 <sub>b</sub>	0.0403
Reebok	-403.0	78.0 <sub>b</sub>	0.0403
Nike CrossTrainer	-368.1	87.7 <sub>b</sub>	0.0364
Rockport	-372.4	97.6 <sub>b</sub>	0.0403
RedWing	-391.1	89.8 <sub>b</sub>	0.0455
No Load	-387.3	81.8	0.0443
Combat Boot	-372.9	78.3	0.0486
Jungle Boot	-352.2	68.9	0.0424
Reebok	-422.6	71.8	0.0407
Nike CrossTrainer	-383.4	80.2	0.0370
Rockport	-389.3	102.5	0.0472
RedWing	-403.5	89.4	0.0497
50 lb Load	-382.5	87.3	0.0356
Combat Boot	-367.2	73.2	0.0339
Jungle Boot	-382.0	82.0	0.0375
Reebok	-389.7	80.3	0.0354
Nike CrossTrainer	-373.5	99.0	0.0343
Rockport	-379.8	94.8	0.0340
RedWing	-401.2	92.9	0.0388
70 lb Load	-365.2	85.1	0.0414
Combat Boot	-367.7	66.3	0.0365
Jungle Boot	-366.3	90.1	0.0407
Reebok	-396.1	82.3	0.0454
Nike CrossTrainer	-347.5	83.9	0.0381
Rockport	-348.0	95.4	0.0398
RedWing	-368.7	87.2	0.0482
<u>F ratios</u>			
Fitness	<1	<1	<1
Shoe	1.71	4.94*	1.91
Fitness X Shoe	<1	<1	<1
Load	<1	1.17	<1
Fitness X Load	<1	<1	<1
Shoe X Load	1.14	<1	<1
Fitness X Shoe X Load	<1	<1	<1



Table C-24 - Anterior Tibialis parameter means and *F* ratios during walking for women (*N* = 15)

	Variables		
	EMG1	EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	-466.2	75.3	0.0483
Medium	-336.1	110.5	0.0259
High	-240.0	102.6	0.0193
Shoe			
Combat Boot	-363.8	103.6	0.0333
Jungle Boot	-343.0	91.6	0.0330
Reebok	-305.2	111.8	0.0302
Nike CrossTrainer	-361.4	82.4	0.0304
Rockport	-356.2	98.2	0.0308
RedWing	-362.5	89.0	0.0295
No Load	-369.7	83.2	0.0339
Combat Boot	-420.8	80.3	0.0387
Jungle Boot	-337.3	89.8	0.0361
Reebok	-385.1	76.7	0.0347
Nike CrossTrainer	-354.6	78.7	0.0326
Rockport	-345.1	100.2	0.0342
RedWing	-375.9	72.1	0.0266
50 lb Load	-326.6	109.5	0.0258
Combat Boot	-306.8	126.8	0.0279
Jungle Boot	-348.7	93.3	0.0299
Reebok	-225.2	146.9	0.0257
Nike CrossTrainer	-368.2	86.2	0.0283
Rockport	-368.7	96.0	0.0270
RedWing	-349.1	105.9	0.0324
<u>F ratios</u>			
Fitness	1.02	1.54	1.18
Shoe	<1	<1	<1
Fitness X Shoe	1.41	1.04	<1
Load	2.72	2.77	<1
Fitness X Load	2.57	1.70	<1
Shoe X Load	2.51	1.01	1.60
Fitness X Shoe X Load	1.96	<1	1.77

Table C-25 - Gastrocnemius/soleus parameter means and *F* ratios during walking for men (*N* = 15)

	Variables		
	EMG1	EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	189.5	543.5	0.0331
Medium	257.7	602.6	0.0285
High	208.6	595.2	0.0398
Shoe			
Combat Boot	230.1	585.2	0.0319
Jungle Boot	216.7	571.1	0.0324
Reebok	207.4	561.6	0.0329
Nike CrossTrainer	192.8	568.1	0.0364
Rockport	240.3	600.9	0.0339
RedWing	223.3	594.2	0.0352
No Load	238.0	574.8	0.0258 <del>X</del>
Combat Boot	249.3	575.8	0.0281
Jungle Boot	234.1	576.9	0.0238
Reebok	221.1	567.3	0.0237
Nike CrossTrainer	218.2	573.7	0.0281
Rockport	266.9	580.7	0.0256
RedWing	238.7	574.5	0.0258
50 lb Load	214.2	591.9	0.0322 <del>XY</del>
Combat Boot	224.5	593.4	0.0285
Jungle Boot	216.0	578.3	0.0297
Reebok	228.0	577.3	0.0267
Nike CrossTrainer	197.8	593.5	0.0361
Rockport	214.3	601.4	0.0335
RedWing	205.9	605.5	0.0382
70 lb Load	202.7	574.7	0.0434 <del>Y</del>
Combat Boot	216.0	587.2	0.0388
Jungle Boot	200.0	559.4	0.0434
Reebok	170.0	538.2	0.0496
Nike CrossTrainer	162.4	537.3	0.0449
Rockport	239.7	620.4	0.0425
RedWing	225.3	602.7	0.0416
<u>F ratios</u>			
Fitness	2.87	1.01	1.61
Shoe	2.63	1.84	<1
Fitness X Shoe	2.25	1.10	<1
Load	<1	<1	7.33*
Fitness X Load	1.28	<1	3.97
Shoe X Load	<1	1.73	1.85
Fitness X Shoe X Load	<1	1.24	1.44

Table C-26 - Gastrocnemius/soleus parameter means and  $F$  ratios  
during walking for women ( $N = 15$ )

	Variables		
	EMG1	EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	238.1	555.4	0.0244
Medium	109.9	485.6	0.0515
High	214.3	537.7	0.0356
Shoe			
Combat Boot	184.1	520.4	0.0472
Jungle Boot	195.8	530.1	0.0301
Reebok	165.2	523.9	0.0328
Nike CrossTrainer	190.9	519.6	0.0387
Rockport	204.4	533.9	0.0387
RedWing	184.3	529.7	0.0355
No Load	224.3	551.3	0.0399
Combat Boot	230.7	540.7	0.0527
Jungle Boot	236.7	559.6	0.0298
Reebok	222.3	546.8	0.0296
Nike CrossTrainer	213.1	548.9	0.0464
Rockport	237.6	560.4	0.0444
RedWing	204.6	553.3	0.0363
50 lb Load	150.6	500.9	0.0345
Combat Boot	137.6	500.1	0.0417
Jungle Boot	154.0	500.6	0.0304
Reebok	108.0	501.0	0.0361
Nike CrossTrainer	168.7	490.2	0.0309
Rockport	171.3	507.3	0.0330
RedWing	164.0	506.0	0.0347
<u>F ratios</u>			
Fitness	1.35	<1	1.24
Shoe	1.38	<1	1.19
Fitness X Shoe	<1	1.32	<1
Load	1.52	1.20	<1
Fitness X Load	<1	1.23	<1
Shoe X Load	1.31	<1	<1
Fitness X Shoe X Load	<1	<1	<1

Table C-27 - Physiological parameter means and *F* ratios during walking for men (*N* = 15)

	Variables		
	M1	M2	M3
<u>Conditions</u>			
Fitness			
Low	15.22	0.87	105.58
Medium	14.34	0.81	98.54
High	13.01	0.91	103.07
Shoe			
Combat Boot	13.71	0.92	101.89
Jungle Boot	13.83	0.89	101.47
Reebok	14.11	0.80	101.88
Nike CrossTrainer	14.46	0.85	104.43
Rockport	14.50	0.86	100.19
RedWing	14.50	0.90	104.64
No Load	13.27x	0.88	100.14
Combat Boot	13.38	0.88	101.28
Jungle Boot	12.81	0.92	95.14
Reebok	13.61	0.82	101.84
Nike CrossTrainer	13.64	0.88	99.14
Rockport	13.13	0.89	98.71
RedWing	13.10	0.89	105.66
50 lb Load	14.38y	0.87	102.40
Combat Boot	14.13	0.90	104.60
Jungle Boot	13.68	0.90	102.61
Reebok	13.88	0.78	100.96
Nike CrossTrainer	14.75	0.80	100.80
Rockport	15.70	0.83	100.44
RedWing	14.18	0.95	105.11
70 lb Load	14.94y	0.86	104.72
Combat Boot	13.55	0.95	98.91
Jungle Boot	15.13	0.84	106.51
Reebok	14.93	0.80	102.99
Nike CrossTrainer	15.07	0.86	114.45
Rockport	14.51	0.86	101.20
RedWing	16.27	0.85	103.09
<u>F ratios</u>			
Fitness	5.63	1.50	<1
Shoe	<1	1.24	<1
Fitness X Shoe	1.46	1.45	<1
Load	7.34*	2.35	<1
Fitness X Load	2.68	1.46	<1
Shoe X Load	<1	<1	<1
Fitness X Shoe X Load	1.01	1.06	1.47

Table C-28 - Physiological parameter means and *F* ratios during walking for women (*N* = 15)

	Variables		
	M1	M2	M3
<u>Conditions</u>			
Fitness			
Low	12.45	0.80	95.80
Medium	11.97	0.92	109.94
High	13.53	0.80	102.78
Shoe			
Combat Boot	12.78 <sub>a b</sub>	0.89	105.56
Jungle Boot	12.76 <sub>a b</sub>	0.82	103.12
Reebok	12.30 <sub>a b</sub>	0.84	101.04
Nike CrossTrainer	11.78 <sub>b</sub>	0.83	99.67
Rockport	12.54 <sub>a b</sub>	0.81	100.43
RedWing	13.97 <sub>a</sub>	0.83	104.43
No Load	12.28	0.82	103.11
Combat Boot	12.99	0.87	109.38
Jungle Boot	12.26	0.80	105.17
Reebok	11.86	0.81	102.58
Nike CrossTrainer	11.01	0.84	97.39
Rockport	11.62	0.80	99.45
RedWing	13.99	0.78	103.35
50 lb Load	13.05	0.85	101.81
Combat Boot	12.70	0.89	101.75
Jungle Boot	13.31	0.85	101.33
Reebok	12.79	0.86	99.51
Nike CrossTrainer	12.17	0.82	101.96
Rockport	13.37	0.82	101.16
RedWing	13.95	0.87	105.67
<u>F ratios</u>			
Fitness	<1	<1	<1
Shoe	3.89*	1.09	<1
Fitness X Shoe	<1	<1	1.00
Load	<1	<1	<1
Fitness X Load	1.90	<1	<1
Shoe X Load	<1	<1	<1
Fitness X Shoe X Load	1.02	1.78	1.36

## **APPENDIX D**

### **MEANS AND *F* RATIOS FOR OVERGROUND AND TREADMILL MARCHING PARAMETERS**

## KEY FOR ABBREVIATIONS OF VARIABLE NAMES

### *Vertical Ground Reaction Force Component*

- Fz1 -- first maximum force (N/kg of body mass)
- Fz2 -- relative time to first maximum force (%)
- Fz3 -- second maximum force (N/kg of body mass)
- Fz4 -- relative time to second maximum force (%)
- Fz5 -- average vertical force (N/kg of body mass)
- Fz6 -- total vertical impulse (N·s/kg of body mass)

### *Antero-posterior Ground Reaction Force Component*

- Fy1 -- maximum braking force (N/kg of body mass)
- Fy2 -- relative time to maximum braking force (%)
- Fy3 -- relative time to transition force (%)
- Fy4 -- maximum propelling force (N/kg of body mass)
- Fy5 -- relative time to maximum propelling force (%)

### *Medio-lateral Ground Reaction Force Component*

- Fx1 -- force excursions 0-30% of contact period (N/kg of body mass)
- Fx2 -- force excursions 0-100% of contact period (N/kg of body mass)

### *In-shoe Pressure*

- P1 -- peak heel pressure (kPa)
- P2 -- peak forefoot pressure (kPa)
- P3 -- total movement distance of center of pressure (cm)

### *Hip Angle*

- H1 -- maximum flexion (degrees)
- H2 -- maximum extension (degrees)
- H3 -- maximum flexion velocity (degrees/s)
- H4 -- time to maximum flexion velocity (ms)
- H5 -- maximum extension velocity (degrees/s)
- H6 -- time to maximum extension velocity (ms)

### *Knee Angle*

- K1 -- maximum flexion (degrees)
- K2 -- maximum extension (degrees)
- K3 -- maximum flexion velocity (degrees/s)
- K4 -- time to maximum flexion velocity (ms)
- K5 -- maximum extension velocity (degrees/s)
- K6 -- time to maximum extension velocity (ms)

***Ankle Angle***

- A1 -- maximum plantarflexion (degrees)
- A2 -- maximum dorsiflexion (degrees)
- A3 -- maximum plantarflexion velocity (degrees/s)
- A4 -- time to maximum plantarflexion velocity (ms)
- A5 -- maximum dorsiflexion velocity (degrees/s)
- A6 -- time to maximum dorsiflexion velocity (ms)

***Metatarsal Angle***

- Mt1 -- maximum flexion (degrees)
- Mt2 -- time to maximum flexion (ms)
- Mt3 -- maximum flexion velocity (degrees/s)
- Mt4 -- time to maximum flexion velocity (ms)

***Rearfoot Movement***

- Rf1 -- rearfoot angle at foot strike (degrees)
- Rf2 -- maximum rearfoot angle (degrees)
- Rf3 -- time to maximum rearfoot angle (ms)
- Rf4 -- total rearfoot motion (degrees)
- Rf5 -- maximum rearfoot velocity (degrees/s)

***Electromyography***

- EMG1 -- time to onset of muscle activity (ms)
- EMG2 -- time to end of muscle activity (ms)
- EMG3 -- area ( $V \cdot s$ )

***Physiological Parameters***

- M1 -- oxygen uptake (ml/kg of body mass/min)
- M2 -- RER (dimensionless)
- M3 -- heart rate (beats/min)



Table D-1 - Vertical ground reaction force component means and *F* ratios during marching for men (*N* = 15)

Conditions	Variables					
	Fz1	Fz2	Fz3	Fz4	Fz5	Fz6
<u>Fitness</u>						
Low	14.54	22.01	13.32	75.89	9.33	6.19
Medium	13.14	22.65	13.03	76.14	8.34	5.65
High	13.90	21.87	13.34	75.65	8.90	5.97
<u>Shoe</u>						
Combat Boot	14.06 <sub>a</sub>	22.06 <sub>a</sub> <sub>b</sub>	13.56 <sub>a</sub>	76.00	8.94	5.94
Jungle Boot	14.09 <sub>a</sub>	21.86 <sub>a</sub> <sub>b</sub>	13.50 <sub>a</sub>	76.00	8.86	5.94
Reebok	13.95 <sub>a</sub> <sub>b</sub>	22.02 <sub>a</sub> <sub>b</sub>	13.05 <sub>b</sub> <sub>c</sub>	75.57	8.83	5.98
Nike CrossTrainer	13.68 <sub>a</sub> <sub>b</sub>	21.59 <sub>b</sub>	12.89 <sub>c</sub>	75.71	8.84	5.89
Rockport	13.58 <sub>b</sub>	22.74 <sub>a</sub>	13.11 <sub>b</sub> <sub>c</sub>	75.90	8.79	5.88
RedWing	13.81 <sub>a</sub> <sub>b</sub>	22.80 <sub>a</sub>	13.26 <sub>b</sub>	76.15	8.88	5.99
<u>No Load</u>						
Combat Boot	11.47 <sub>X</sub>	22.15	10.93 <sub>X</sub>	76.20 <sub>X</sub> <sub>Y</sub>	7.46 <sub>X</sub>	4.88 <sub>X</sub>
Jungle Boot	11.69	21.95	11.14	76.21	7.52	4.87
Reebok	11.66	21.90	11.13	76.37	7.44	4.89
Nike CrossTrainer	11.50	21.95	10.80	76.04	7.42	4.90
Rockport	11.47	21.61	10.60	75.94	7.44	4.84
RedWing	11.08	22.74	10.89	76.19	7.42	4.80
	11.43	22.74	11.02	76.47	7.51	4.98
<u>50 lb Load</u>						
Combat Boot	14.28 <sub>Y</sub>	22.30	13.64 <sub>Y</sub>	75.91 <sub>X</sub>	9.11 <sub>Y</sub>	6.12 <sub>Y</sub>
Jungle Boot	14.53	22.26	13.95	76.23	9.21	6.12
Reebok	14.53	22.11	13.93	75.89	9.11	6.14
Nike CrossTrainer	14.36	22.04	13.59	75.46	9.13	6.12
Rockport	14.09	21.64	13.38	75.64	9.08	6.12
RedWing	14.01	22.69	13.45	75.93	9.05	6.00
	14.15	23.03	13.52	76.33	9.06	6.22

Table D-1 - (continued)

	Variables					
	Fz1	Fz2	Fz3	Fz4	Fz5	Fz6
70 lb Load	15.84Z	22.09	15.12Z	76.56Y	10.08Z	6.81Z
Combat Boot	16.07	21.96	15.58	75.57	10.09	6.83
Jungle Boot	16.18	21.58	15.45	75.75	10.02	6.81
Reebok	15.89	22.07	14.75	75.20	9.95	6.82
Nike CrossTrainer	15.67	21.52	14.69	75.58	10.01	6.76
Rockport	15.45	22.79	14.99	75.58	9.91	6.73
RedWing	15.76	22.62	15.24	75.66	10.07	6.92
<u>F ratios</u>						
Fitness	<1	<1	<1	<1	1.00	<1
Shoe	4.67*	4.54*	17.02*	<1	<1	3.58
Fitness X Shoe	<1	<1	<1	<1	<1	<1
Load	405.11*	<1	224.74*	9.53*	142.96*	778.41*
Fitness X Load	133.73*	<1	115.31*	2.85	210.70*	214.08*
Shoe X Load	<1	<1	1.02	1.37	<1	<1
Fitness X Shoe X Load	1.06	<1	2.21	1.50	<1	1.15

Table D-2 - Vertical ground reaction force component means and *F* ratios during marching for women (*N* = 15)

Conditions	Variables					
	Fz1	Fz2	Fz3	Fz4	Fz5	Fz6
<u>Fitness</u>						
Low	13.65	21.80	12.85	77.49	8.87	5.55
Medium	12.63	22.21	12.97	76.24	8.85	5.63
High	13.09	21.52	12.89	75.93	8.99	5.79
<u>Shoe</u>						
Combat Boot	13.16a	21.92ab	13.14a	76.31a	8.94a	5.71
Jungle Boot	13.08ab	21.81ab	13.08a	76.34a	8.87b	5.68
Reebok	12.99b	21.55a	12.65b	76.47a	8.88b	5.64
Nike CrossTrainer	13.13a	21.48a	12.66b	76.85b	8.91a	5.58
Rockport	12.98b	22.20b	12.82ab	76.82b	8.84b	5.60
RedWing	13.40a	22.11b	13.09a	76.54a	8.99a	5.74
<u>No Load</u>	11.44X	21.77	11.29X	76.82	7.86X	4.91X
Combat Boot	11.51	21.81	11.45	76.40	7.90	4.96
Jungle Boot	11.44	21.61	11.50	76.61	7.84	4.93
Reebok	11.29	21.50	11.04	76.76	7.83	4.91
Nike CrossTrainer	11.47	21.47	11.02	77.22	7.87	4.84
Rockport	11.32	22.07	11.26	77.16	7.81	4.85
RedWing	11.59	22.10	11.47	76.80	7.93	5.00
<u>50 lb Load</u>	14.81Y	21.92	14.52Y	76.28	9.94Y	6.40Y
Combat Boot	14.92	21.95	14.83	76.12	9.97	6.45
Jungle Boot	14.71	22.00	14.65	76.08	9.90	6.43
Reebok	14.60	21.60	14.25	76.18	9.92	6.36
Nike CrossTrainer	14.80	21.49	14.30	76.58	9.96	6.33
Rockport	14.63	22.33	14.37	76.57	9.86	6.35
RedWing	15.21	22.12	14.72	76.18	10.04	6.50

Table D-2 - (continued)

	Variables					
	Fz1	Fz2	Fz3	Fz4	Fz5	Fz6
<u>F ratios</u>						
Fitness	1.59	<1	<1	<1	<1	<1
Shoe	4.09*	7.78*	16.97*	3.84*	7.33*	1.33
Fitness X Shoe	1.53	<1	<1	<1	<1	<1
Load	330.04*	<1	111.18*	2.77	886.52*	245.36*
Fitness X Load	49.65*	2.28	28.77*	4.79	30.18*	28.34*
Shoe X Load	1.46	<1	1.10	1.75	<1	<1
Fitness X Shoe X Load	1.26	<1	1.28	1.30	<1	1.07

Table D-3 - Antero-posterior ground reaction force component means and *F* ratios during marching for men (*N* = 15)

Conditions	Variables				
	Fy1	Fy2	Fy3	Fy4	Fy5
<u>Fitness</u>					
Low	-2.68	17.49	50.06	2.77	84.15
Medium	-2.42	18.48	50.07	2.55	83.01
High	-2.36	17.83	50.67	2.80	82.61
<u>Shoe</u>					
Combat Boot	-2.47 <sup>a</sup>	18.08 <sup>a</sup>	51.43	2.68	83.23
Jungle Boot	-2.53 <sup>b</sup>	18.02 <sup>a</sup>	50.25	2.73	82.77
Reebok	-2.58 <sup>b</sup>	17.97 <sup>a</sup> <sup>b</sup>	50.06	2.70	83.08
Nike CrossTrainer	-2.58 <sup>b</sup>	16.95 <sup>b</sup>	50.07	2.70	83.56
Rockport	-2.40 <sup>a</sup>	18.13 <sup>a</sup>	50.25	2.77	83.47
RedWing	-2.36 <sup>a</sup>	18.47 <sup>a</sup>	49.54	2.68	83.42
<u>No Load</u>					
Combat Boot	-1.93 <sup>X</sup>	17.77	49.99	2.25 <sup>X</sup>	83.24
Jungle Boot	-1.88	18.03	50.63	2.25	83.19
Reebok	-1.93	18.01	50.06	2.27	82.68
Nike CrossTrainer	-2.01	17.79	50.08	2.26	83.13
Rockport	-2.05	16.58	50.07	2.20	83.67
RedWing	-1.86	18.01	50.63	2.28	83.53
	-1.86	18.21	48.50	2.25	83.23
<u>50 lb Load</u>					
Combat Boot	-2.52 <sup>Y</sup>	18.05	50.15	2.77 <sup>Y</sup>	83.37
Jungle Boot	-2.51	18.16	50.61	2.80	83.41
Reebok	-2.53	18.04	50.06	2.79	82.86
Nike CrossTrainer	-2.63	18.05	50.05	2.76	83.13
Rockport	-2.60	17.14	50.06	2.75	83.58
RedWing	-2.45	18.14	50.06	2.78	83.56
	-2.39	18.75	50.06	2.69	83.68

Table D-3 - (continued)

	Variables				
	Fy1	Fy2	Fy3	Fy4	Fy5
70 lb Load	-3.01Z	17.99	50.65	3.11Z	83.15
Combat Boot	-3.01	18.06	53.06	3.01	83.10
Jungle Boot	-3.12	18.00	50.62	3.13	82.77
Reebok	-3.09	18.06	50.06	3.07	82.97
Nike CrossTrainer	-3.10	17.14	50.08	3.13	83.43
Rockport	-2.90	18.22	50.05	3.21	83.30
RedWing	-2.84	18.44	50.07	3.09	83.34
<u>F ratios</u>					
Fitness	<1	<1	<1	<1	2.06
Shoe	5.48*	4.74*	2.75	1.29	1.84
Fitness X Shoe	<1	1.12	1.98	<1	1.29
Load	142.97*	<1	3.06	48.71*	<1
Fitness X Load	31.30*	1.00	2.90	15.49*	1.01
Shoe X Load	<1	<1	1.20	1.16	1.09
Fitness X Shoe X Load	1.26	<1	1.65	1.94	1.60

Table D-4 - Antero-posterior ground reaction force component means and *F* ratios during marching for women (*N* = 15)

Conditions	Variables				
	Fy1	Fy2	Fy3	Fy4	Fy5
<u>Fitness</u>					
Low	-2.72	17.18	50.05	2.50	84.23
Medium	-1.40	18.96	50.06	1.49	84.11
High	-2.45	16.20	63.57	1.86	84.00
<u>Shoe</u>					
Combat Boot	-2.22ab	17.73ac	54.11	1.95	83.78a
Jungle Boot	-2.12a	17.56ac	54.83	1.94	83.93ab
Reebok	-2.15a	17.18bc	54.78	1.87	84.22bc
Nike CrossTrainer	-2.29b	16.44b	56.83	1.90	84.56c
Rockport	-2.18ab	17.51ac	54.31	2.04	84.24bc
RedWing	-2.20ab	18.27a	52.50	2.03	83.96ab
<u>No Load</u>					
Combat Boot	-1.88X	17.31	53.72	1.75X	84.11
Jungle Boot	-1.90	17.75	53.00	1.74	83.60
Reebok	-1.82	17.41	55.55	1.71	84.03
Nike CrossTrainer	-1.83	16.95	53.16	1.70	84.23
Rockport	-1.98	16.05	57.25	1.62	84.69
RedWing	-1.89	17.33	51.61	1.92	84.17
	-1.87	18.38	51.72	1.83	83.94
<u>50 lb Load</u>					
Combat Boot	-2.51Y	17.66	55.41	2.15Y	84.12
Jungle Boot	-2.54	17.71	55.22	2.17	83.95
Reebok	-2.42	17.99	54.12	2.17	83.84
Nike CrossTrainer	-2.43	17.41	56.40	2.04	84.21
Rockport	-2.61	16.83	56.40	2.16	84.45
RedWing	-2.50	17.88	57.02	2.15	84.31
	-2.58	18.16	53.28	2.20	83.98

Table D-4 - (continued)

	Variables				
	Fy1	Fy2	Fy3	Fy4	Fy5
<u>F ratios</u>					
Fitness	1.44	2.48	2.95	2.62	<1
Shoe	4.61*	9.29*	<1	1.16	10.90*
Fitness X Shoe	6.74*	2.81	1.86	1.24	<1
Load	69.51*	9.13	2.93	16.97*	<1
Fitness X Load	31.67*	2.79	2.93	10.65*	<1
Shoe X Load	1.48	1.72	3.39*	1.54	1.50
Fitness X Shoe X Load	1.78	1.33	2.39	1.97	1.63



Appendix D

Table D-5 - Mediolateral ground reaction force component means and *F* ratios during marching for men (*N* = 15)

Variables	F ratios	
	Fx1	Fx2
<u>Conditions</u>		
Fitness		
Low	1.47	3.17
Medium	1.21	2.90
High	1.50	3.37
Shoe		
Combat Boot	1.41	3.19
Jungle Boot	1.41	3.30
Reebok	1.34	3.08
Nike CrossTrainer	1.47	3.20
Rockport	1.40	3.07
RedWing	1.34	3.05
No Load	1.37	2.90x
Combat Boot	1.33	2.87
Jungle Boot	1.39	3.05
Reebok	1.32	2.85
Nike CrossTrainer	1.50	3.03
Rockport	1.36	2.80
RedWing	1.31	2.81
50 lb Load	1.38	3.16x y
Combat Boot	1.39	3.20
Jungle Boot	1.38	3.31
Reebok	1.32	3.11
Nike CrossTrainer	1.43	3.18
Rockport	1.44	3.14
RedWing	1.33	3.03
70 lb Load	1.43	3.38y
Combat Boot	1.50	3.50
Jungle Boot	1.45	3.53
Reebok	1.38	3.28
Nike CrossTrainer	1.48	3.38
Rockport	1.40	3.27
RedWing	1.37	3.31
<u>F ratios</u>		
Fitness	<1	<1
Shoe	2.00	2.47
Fitness X Shoe	<1	<1
Load	<1	9.52*
Fitness X Load	<1	4.51*
Shoe X Load	1.76	1.26
Fitness X Shoe X Load	1.06	1.28

Table D-6 - Medio-lateral ground reaction force component means and *F* ratios during marching for women (*N* = 15)

	Variables	
	Fx1	Fx2
<u>Conditions</u>		
Fitness		
Low	1.06	2.71
Medium	0.84	1.66
High	1.51	3.17
Shoe		
Combat Boot	1.14	2.57
Jungle Boot	1.25	2.63
Reebok	1.05	2.46
Nike CrossTrainer	1.10	2.52
Rockport	1.12	2.39
RedWing	1.16	2.51
No Load	1.07x	2.33x
Combat Boot	1.04	2.36
Jungle Boot	1.21	2.48
Reebok	1.02	2.12
Nike CrossTrainer	1.03	2.12
Rockport	1.06	2.18
RedWing	1.07	2.29
50 lb Load	1.20y	2.70y
Combat Boot	1.24	2.78
Jungle Boot	1.28	2.78
Reebok	1.07	2.60
Nike CrossTrainer	1.16	2.60
Rockport	1.18	2.59
RedWing	1.24	2.72
<u>F ratios</u>		
Fitness	2.85	1.41
Shoe	1.47	<1
Fitness X Shoe	3.10*	9.41*
Load	173.84*	970.82*
Fitness X Load	3.96	14.74*
Shoe X Load	1.38	1.70
Fitness X Shoe X Load	1.53	1.60

Table D-7 - In-shoe pressure parameter means and F ratios during marching for men (N = 15)

	Variables		
	P1	P2	P3
<u>Conditions</u>			
Fitness			
Low	568.63	522.88	22.38
Medium	489.44	443.02	20.96
High	463.23	453.77	19.23
Shoe			
Combat Boot	534.87	416.25	21.57
Jungle Boot	588.34	444.87	19.83
Reebok	566.79	391.59	20.41
Nike CrossTrainer	407.06	494.06	23.84
Rockport	552.33	428.20	20.67
RedWing	501.92	428.50	21.34
No Load	426.72	377.48	20.22
Combat Boot	424.99	378.16	22.55
Jungle Boot	586.84	392.06	16.51
Reebok	466.39	348.03	20.05
Nike CrossTrainer	316.25	438.42	22.36
Rockport	423.44	406.86	19.68
RedWing	323.99	352.51	20.56
50 lb Load	575.08	409.06	19.88
Combat Boot	530.07	423.70	22.37
Jungle Boot	508.74	397.82	20.95
Reebok	756.26	369.33	16.12
Nike CrossTrainer	469.25	497.15	20.07
Rockport	650.54	359.10	20.21
RedWing	548.12	415.32	18.96
70 lb Load	584.00	524.41	23.94
Combat Boot	672.48	453.69	19.42
Jungle Boot	685.56	564.70	22.49
Reebok	497.80	466.11	25.14
Nike CrossTrainer	430.92	537.84	28.22
Rockport	589.14	536.72	22.42
RedWing	658.70	584.45	25.14
<u>F ratios</u>			
Fitness	<1	1.06	<1
Shoe	1.13	1.02	1.03
Fitness X Shoe	<1	<1	<1
Load	1.02	1.82	5.16
Fitness X Load	1.68	1.21	<1
Shoe X Load	<1	<1	1.68
Fitness X Shoe X Load	1.11	1.02	1.32

Table D-8 - In-shoe pressure parameter means and *F* ratios during marching for women (*N* = 15)

	Variables		
	P1	P2	P3
<u>Conditions</u>			
Fitness			
Low	533.45	551.68	22.53
Medium	559.22	524.79	20.17
High	541.35	564.22	21.56
Shoe			
Combat Boot	532.23	478.23	19.08 <sub>a</sub>
Jungle Boot	606.92	524.75	20.11 <sub>a</sub>
Reebok	495.01	486.82	20.55 <sub>a</sub>
Nike CrossTrainer	576.21	602.08	21.75 <sub>b</sub>
Rockport	697.18	631.95	19.70 <sub>a</sub>
RedWing	542.11	515.98	19.89 <sub>a</sub>
No Load	554.57	441.45	20.01
Combat Boot	506.95	379.32	19.16
Jungle Boot	590.35	410.50	19.57
Reebok	438.19	329.52	20.79
Nike CrossTrainer	539.79	508.99	21.85
Rockport	699.09	582.04	19.44
RedWing	553.04	438.37	19.25
50 lb Load	595.32	638.48	20.52
Combat Boot	557.50	577.13	19.01
Jungle Boot	623.48	639.00	20.66
Reebok	551.83	644.13	20.30
Nike CrossTrainer	612.64	695.16	22.64
Rockport	695.28	681.87	19.97
RedWing	531.19	593.60	20.54
<u>F ratios</u>			
Fitness	<1	<1	<1
Shoe	<1	<1	3.86*
Fitness X Shoe	1.23	1.41	1.02
Load	<1	6.74	1.11
Fitness X Load	<1	1.00	1.03
Shoe X Load	<1	<1	<1
Fitness X Shoe X Load	<1	<1	<1

Table D-9 - Hip angle parameter means and *F* ratios during marching for men (*N* = 15)

	Variables					
	H1	H2	H3	H4	H5	H6
<b>Conditions</b>						
<b>Fitness</b>						
Low	30.47	1.47	162.76	650	193.42	706
Medium	29.61	5.93	164.31	644	176.22	690
High	33.87	12.36	178.02	654	184.25	687
<b>Shoe</b>						
Combat Boot	30.90	6.61a	168.86a	648	185.54	692
Jungle Boot	32.37	7.98a	170.62a	652	183.49	698
Reebok	32.08	7.17a	173.46a	653	185.75	692
Nike CrossTrainer	30.29	4.98b	169.85a	646	187.42	688
Rockport	30.16	6.11b	165.93a	646	182.57	691
RedWing	32.18	6.70a	161.63b	651	183.22	706
<b>No Load</b>						
Combat Boot	19.54X	1.73X	141.28X	632X	161.37X	683X
Jungle Boot	18.01	1.93	142.61	630	163.22	683
Reebok	20.13	2.35	144.12	628	156.76	688
Nike CrossTrainer	20.30	2.05	145.11	634	160.37	674
Rockport	18.74	0.26	146.75	629	167.84	654
RedWing	19.26	1.12	143.77	635	157.60	687
	20.82	2.74	124.56	638	162.03	695
<b>50 lb Load</b>						
Combat Boot	33.26Y	7.88Y	170.99Y	652Y	186.47Y	700Y
Jungle Boot	31.96	8.70	175.65	649	187.68	697
Reebok	33.26	8.80	172.10	659	186.97	713
Nike CrossTrainer	34.39	8.40	178.81	658	189.21	699
Rockport	31.98	6.59	167.79	649	185.79	651
RedWing	33.89	6.56	175.56	649	184.22	703
	34.06	8.23	156.03	649	184.94	705

Table D-9 - (continued)

	Variables					
	H1	H2	H3	H4	H5	H6
70 lb Load	41.02Z	10.09Y	192.50Z	663Y	205.85Z	700Y
Combat Boot	38.73	11.21	193.33	663	205.71	701
Jungle Boot	42.70	12.34	193.43	668	204.50	701
Reebok	42.56	11.08	196.45	668	207.68	702
Nike CrossTrainer	38.16	7.10	195.02	659	208.62	689
Rockport	42.33	7.65	192.45	656	205.88	690
RedWing	41.65	11.14	184.30	668	202.70	717
<u>F ratios</u>						
Fitness	<1	1.73	1.23	<1	<1	<1
Shoe	3.40	8.50*	3.85*	<1	1.59	3.74
Fitness X Shoe	<1	1.84	1.41	<1	<1	<1
Load	95.80*	36.79*	212.35*	32.00*	107.74*	7.19*
Fitness X Load	36.38*	9.26*	16.16*	13.86*	13.17*	1.92
Shoe X Load	1.01	2.92	2.05	<1	1.04	1.22
Fitness X Shoe X Load	1.14	1.43	1.51	1.54	<1	1.06

Table D-10 - Hip angle parameter means and *F* ratios during marching for women (N = 15)

Conditions	Variables					
	H1	H2	H3	H4	H5	H6
<u>Fitness</u>						
Low	21.76	-3.82	174.81	607	216.23	664
Medium	28.41	4.41	139.28	603	192.89	667
High	25.23	1.98	167.99	622	214.60	681
<u>Shoe</u>						
Combat Boot	26.31	1.53	163.71	613	212.14	671
Jungle Boot	24.89	0.41	156.38	616	205.41	680
Reebok	22.88	0.46	153.93	600	200.31	668
Nike CrossTrainer	24.58	1.03	167.01	612	206.04	662
Rockport	26.01	1.32	157.79	607	206.97	668
RedWing	25.90	0.68	163.15	614	214.69	674
<u>No Load</u>						
Combat Boot	18.52X	-2.65X	146.17X	604X	202.57	667
Jungle Boot	19.67	-2.05	152.00	606	207.01	667
Reebok	18.01	-2.58	142.48	609	200.93	675
Nike CrossTrainer	17.58	-1.23	151.99	594	195.38	663
Rockport	17.55	-3.10	151.21	601	197.56	652
RedWing	19.14	-4.25	128.65	599	197.78	669
	19.20	-2.89	147.41	610	214.92	674
<u>50 lb Load</u>						
Combat Boot	31.81Y	4.48Y	175.09Y	618Y	213.21	674
Jungle Boot	32.96	5.10	175.42	620	217.26	674
Reebok	31.77	3.40	170.27	622	209.90	684
Nike CrossTrainer	29.94	2.70	156.51	608	206.89	675
Rockport	31.60	5.17	182.81	622	214.53	671
RedWing	31.36	5.64	180.45	614	214.11	667
	32.61	4.25	178.88	618	214.45	675

Table D-10 - (continued)

<u>F ratios</u>	Variables					
	H1	H2	H3	H4	H5	H6
Fitness	<1	7.89	<1	<1	<1	<1
Shoe	2.03	<1	1.63	1.54	1.46	1.80
Fitness X Shoe	<1	2.08	<1	<1	<1	<1
Load	20.38*	86.61*	44.35*	27.49*	11.29	2.68
Fitness X Load	96.17*	41.43*	11.06*	3.27	4.97	<1
Shoe X Load	<1	5.14*	3.90*	<1	<1	<1
Fitness X Shoe X Load	<1	2.65	2.40	1.21	<1	<1



Table D-11 - Knee angle parameter means and *F* ratios during marching for men (*N* = 15)

Conditions	Variables					
	K1	K2	K3	K4	K5	K6
Fitness						
Low	43.50	0.61	352.33	621	296.22	665
Medium	51.87	3.01	356.91	607	258.02	665
High	55.38	4.97	371.99	617	263.62	672
Shoe						
Combat Boot	51.40 <sup>a</sup>	2.70	366.95 <sup>a</sup>	615	274.24	667
Jungle Boot	51.84 <sup>a</sup>	3.01	371.10 <sup>a</sup>	619	273.68	673
Reebok	51.20 <sup>a c</sup>	3.11	361.78 <sup>a c</sup>	616	266.42	673
Nike CrossTrainer	48.68 <sup>b</sup>	2.55	346.82 <sup>b</sup>	609	268.45	660
Rockport	48.91 <sup>b</sup>	3.02	353.76 <sup>b c</sup>	613	273.79	661
RedWing	49.84 <sup>b c</sup>	2.79	362.46 <sup>a c</sup>	621	279.54	669
No Load	49.76	1.01 <sup>x</sup>	346.34 <sup>x</sup>	604 <sup>x</sup>	272.26	652 <sup>x</sup>
Combat Boot	50.63	0.00	355.63	602	273.82	650
Jungle Boot	50.59	1.13	355.05	604	275.94	660
Reebok	50.32	1.37	346.74	602	267.37	649
Nike CrossTrainer	48.57	1.15	334.87	599	269.70	645
Rockport	48.84	1.41	336.17	607	270.36	652
RedWing	49.62	1.00	350.33	608	276.70	654
50 lb Load	50.90	2.98 <sup>x y</sup>	362.71 <sup>x y</sup>	618 <sup>y</sup>	272.32	669 <sup>y</sup>
Combat Boot	51.89	2.85	368.99	618	275.58	670
Jungle Boot	52.65	2.58	371.82	625	274.57	677
Reebok	51.99	3.32	366.38	620	267.00	673
Nike CrossTrainer	49.67	3.01	349.19	610	257.00	665
Rockport	49.28	3.24	354.12	613	274.93	662
RedWing	49.94	2.90	365.79	621	284.84	669

Table D-11 - (continued)

	Variables					
	K1	K2	K3	K4	K5	K6
70 lb Load	50.07	45.7Y	372.03Y	624Y	273.47	680Z
Combat Boot	51.67	5.26	386.24	624	273.33	680
Jungle Boot	52.37	5.15	385.11	627	270.72	682
Reebok	51.29	4.65	372.22	626	264.90	698
Nike CrossTrainer	47.49	3.48	356.41	619	278.66	670
Rockport	47.63	4.43	360.98	618	276.10	669
RedWing	49.97	4.47	371.25	632	277.09	683
<u>F ratios</u>						
Fitness	2.09	<1	5.21	<1	1.80	<1
Shoe	12.26*	<1	11.75*	2.20	<1	1.39
Fitness X Shoe	2.01	<1	1.01	<1	<1	<1
Load	3.61	9.21*	22.95*	24.58*	<1	32.31*
Fitness X Load	4	5.26*	6.05*	15.81*	<1	7.59*
Shoe X Load	1.91	1.72	1.02	<1	1.30	1.09
Fitness X Shoe X Load	1.31	<1	1.11	1.37	1.19	1.33

Table D-12 - Knee angle parameter means and *F* ratios during marching for women (N = 15)

Conditions	Variables					
	K1	K2	K3	K4	K5	K6
<u>Fitness</u>						
Low	45.14	2.14	333.36	582	284.84	622
Medium	48.65	6.41	318.92	580	279.18	615
High	48.30	4.33	303.90	588	246.36	635
<u>Shoe</u>						
Combat Boot	47.45	3.59	326.45a	586	282.48	625
Jungle Boot	47.36	4.19	329.91a	590	279.51	628
Reebok	48.41	4.64	304.91b	576	251.95	621
Nike CrossTrainer	48.28	3.79	312.20b	579	257.89	623
Rockport	45.78	3.84	309.33b	582	265.12	622
RedWing	47.15	5.85	323.80a	585	277.08	626
<u>No Load</u>						
Combat Boot	46.85	1.91X	308.94	579X	270.56	617X
Jungle Boot	47.06	1.93	318.87	579	283.19	618
Reebok	46.88	1.65	324.61	585	281.54	620
Nike CrossTrainer	48.83	3.45	299.53	578	254.79	621
Rockport	47.12	1.84	300.92	575	263.36	611
RedWing	44.01	0.90	291.88	575	262.30	611
	46.81	1.62	313.01	579	274.62	622
<u>50 lb Load</u>						
Combat Boot	47.94	6.72Y	327.93	588Y	268.93	631Y
Jungle Boot	47.85	5.24	334.03	593	281.77	633
Reebok	47.84	6.73	345.22	595	277.48	635
Nike CrossTrainer	47.84	6.23	317.09	574	248.16	621
Rockport	49.44	5.75	323.47	582	252.41	635
RedWing	47.15	6.13	322.91	587	267.32	630
	47.50	10.08	334.60	590	279.54	631

Table D-12 - (continued)

	Variables					
	K1	K2	K3	K4	K5	K6
<u>F ratios</u>						
Fitness	<1	<1	2.53	<1	1.40	<1
Shoe	<1	<1	9.58*	2.66	2.80	<1
Fitness X Shoe	<1	<1	<1	<1	1.60	<1
Load	2.21	34.05*	8.28	14.40*	<1	23.63*
Fitness X Load	2.82	17.28*	5.32	1.78	3.48	5.46
Shoe X Load	2.17	<1	1.08	1.22	1.35	1.90
Fitness X Shoe X Load	1.36	<1	<1	<1	<1	1.62

Table D-13 - Ankle angle parameter means and *F* ratios during marching for men (*N* = 15)

Conditions	Variables					
	A1	A2	A3	A4	A5	A6
<u>Fitness</u>						
Low	20.50	-9.03	321.74	609	-135.01	133
Medium	20.29	-11.10	327.58	601	-120.02	136
High	19.06	-10.38	303.66	603	-126.20	228
<u>Shoe</u>						
Combat Boot	19.10 <sup>a</sup> <sup>b</sup>	-10.22 <sup>a</sup> <sup>c</sup>	295.92 <sup>a</sup> <sup>b</sup>	592	-132.46	147
Jungle Boot	21.92 <sup>a</sup>	-9.74 <sup>a</sup> <sup>b</sup>	318.67 <sup>a</sup>	602	-133.84	155
Reebok	16.85 <sup>b</sup>	-12.57 <sup>c</sup>	311.04 <sup>a</sup>	613	-121.74	197
Nike CrossTrainer	21.29 <sup>a</sup>	-10.22 <sup>a</sup> <sup>c</sup>	355.36 <sup>c</sup>	607	-119.58	170
Rockport	19.69 <sup>a</sup> <sup>b</sup>	-11.27 <sup>a</sup> <sup>c</sup>	341.25 <sup>c</sup>	604	-124.81	177
RedWing	20.89 <sup>a</sup>	-6.99 <sup>b</sup>	283.48 <sup>b</sup>	610	-130.42	146
<u>No Load</u>						
Combat Boot	18.87 <sup>X</sup>	-8.75 <sup>X</sup>	291.13 <sup>X</sup>	591 <sup>X</sup>	-120.54 <sup>X</sup>	158
Jungle Boot	17.98	-8.74	266.65	575	-124.07	123
Reebok	20.91	-8.07	287.35	582	-127.42	167
Nike CrossTrainer	16.03	-11.27	289.40	600	-114.45	179
Rockport	19.95	-8.68	326.57	595	-110.84	167
RedWing	18.48	-10.20	316.30	598	-120.01	176
	20.03	-5.48	260.23	597	-127.01	138
<u>50 lb Load</u>						
Combat Boot	20.30 <sup>Y</sup>	-10.45 <sup>Y</sup>	325.06 <sup>Y</sup>	611 <sup>Y</sup>	-127.42 <sup>Y</sup>	163
Jungle Boot	19.35	-10.42	304.76	603	-134.23	163
Reebok	22.32	-10.12	325.01	616	-132.44	134
Nike CrossTrainer	17.07	-13.10	322.75	619	-121.56	169
Rockport	21.95	-10.51	363.50	611	-121.58	182
RedWing	20.13	-11.21	345.31	606	-123.98	169
	20.97	-7.35	288.99	613	-130.72	163

Table D-13 - (continued)

	Variables					
	A1	A2	A3	A4	A5	A6
70 lb Load	20.65Y	-11.29Z	336.29Y	611Y	-133.28Z	175
Combat Boot	19.96	-11.48	316.34	597	-139.07	154
Jungle Boot	22.43	-10.89	341.04	606	-141.12	164
Reebok	17.45	-13.33	320.98	620	-129.22	245
Nike CrossTrainer	21.97	-11.47	376.01	614	-126.31	162
Rockport	20.44	-12.40	362.14	608	-130.44	187
RedWing	21.67	-8.14	301.23	621	-133.51	138
<u>F ratios</u>						
Fitness	<1	<1	<1	<1	<1	1.02
Shoe	4.90*	9.53*	38.10*	2.42	2.74	1.43
Fitness X Shoe	<1	1.17	1.51	<1	1.04	<1
Load	33.93*	78.08*	57.77*	16.60*	37.67*	2.58
Fitness X Load	7.88*	19.92*	25.55*	5.38*	6.18*	<1
Shoe X Load	<1	1.17	3.00*	1.02	1.21	1.36
Fitness X Shoe X Load	<1	1.37	1.11	1.12	<1	1.08

Table D-14 - Ankle angle parameter means and *F* ratios during marching for women (N = 15)

Conditions	Variables					
	A1	A2	A3	A4	A5	A6
<b>Fitness</b>						
Low	19.62	-10.60	322.71	573	-125.08	118
Medium	17.38	-10.83	319.85	569	-122.75	123
High	27.17	-8.24	347.41	575	-121.93	145
<b>Shoe</b>						
Combat Boot	20.18	-9.27a	293.36a	569	-130.24a	121
Jungle Boot	22.88	-8.61a	310.72a	572	-127.16a	126
Reebok	18.32	-13.10b	341.54b	574	-111.92b	136
Nike CrossTrainer	22.96	-10.43a	354.50c	569	-117.79b	130
Rockport	21.85	-10.26a	366.08c	571	-122.88b	129
RedWing	21.93	-8.27a	321.70b	579	-126.79a	135
<b>No Load</b>						
Combat Boot	21.02	-9.27X	318.22	568X	-118.21X	124
Jungle Boot	19.70	-8.54	280.78	563	-125.10	113
Reebok	22.46	-8.05	300.05	568	-123.17	125
Nike CrossTrainer	18.27	-12.89	340.05	575	-109.36	123
Rockport	22.07	-9.62	347.96	561	-115.71	120
RedWing	21.52	-9.52	354.51	564	-114.73	127
	21.93	-7.44	306.43	576	-119.45	137
<b>50 lb Load</b>						
Combat Boot	21.90	-10.46Y	342.25	577Y	-128.23Y	134
Jungle Boot	20.66	-10.02	305.93	574	-135.38	128
Reebok	23.30	-9.17	321.39	577	-136.15	128
Nike CrossTrainer	18.39	-13.38	343.53	572	-115.33	153
Rockport	23.84	-11.23	371.03	577	-119.87	139
RedWing	22.10	-10.84	375.08	577	-125.21	131
	21.93	-9.11	336.98	582	-134.13	133

Table D-14 - (continued)

	Variables					
	A1	A2	A3	A4	A5	A6
<u>F ratios</u>						
Fitness	2.32	1.08	1.66	<1	<1	<1
Shoe	2.87	11.44*	8.19*	1.37	4.17*	<1
Fitness X Shoe	3.48*	2.17	3.09	<1	<1	<1
Load	2.17	20.19*	6.59	13.35*	148.71*	1.32
Fitness X Load	3.35	12.20*	4.48	2.31	4.52	1.34
Shoe X Load	1.13	<1	1.27	1.19	1.01	<1
Fitness X Shoe X Load	<1	1.07	<1	1.07	1.52	1.04



Table D-15 - Metatarsal joint angle parameter means and *F* ratios during marching for men (*N* = 15)

Conditions	Variables			
	Mt1	Mt2	Mt3	Mt4
<u>Fitness</u>				
Low	36.41	598	274.36	620
Medium	36.41	582	304.69	624
High	37.16	587	320.71	629
<u>Shoe</u>				
Combat Boot	41.20 <sup>a</sup> <sup>b</sup>	588 <sup>a</sup>	371.79 <sup>a</sup>	628
Jungle Boot	41.57 <sup>a</sup>	599 <sup>b</sup>	348.64 <sup>a</sup>	636
Reebok	32.50 <sup>d</sup>	584 <sup>a</sup>	315.82 <sup>a</sup>	626
Nike CrossTrainer	33.66 <sup>c</sup> <sup>d</sup>	586 <sup>a</sup>	280.14 <sup>b</sup>	624
Rockport	33.71 <sup>c</sup> <sup>d</sup>	587 <sup>a</sup>	253.18 <sup>c</sup>	623
RedWing	37.48 <sup>b</sup> <sup>c</sup>	591 <sup>a</sup> <sup>b</sup>	231.17 <sup>c</sup>	609
<u>No Load</u>				
Combat Boot	35.43 <sup>X</sup>	574 <sup>X</sup>	272.24 <sup>X</sup>	610 <sup>X</sup>
Jungle Boot	39.69	572	344.13	615
Reebok	39.86	585	314.29	618
Nike CrossTrainer	31.32	566	288.42	609
Rockport	32.84	571	255.22	610
RedWing	32.96	578	215.90	619
	36.29	575	219.00	588
<u>50 lb Load</u>				
Combat Boot	36.96 <sup>Y</sup>	593 <sup>Y</sup>	309.87 <sup>Y</sup>	632 <sup>Y</sup>
Jungle Boot	41.75	594	383.51	634
Reebok	42.09	611	361.40	642
Nike CrossTrainer	32.81	579	323.94	631
Rockport	33.37	590	290.18	628
RedWing	33.64	589	251.51	628
	38.12	593	248.70	626

Table D-15 - (continued)

	Variables			
	Mt1	Mt2	Mt3	Mt4
70 lb Load	37.57Y	600Y	317.19Y	632Y
Combat Boot	42.16	599	387.72	636
Jungle Boot	42.60	608	367.37	646
Reebok	33.36	596	335.10	637
Nike CrossTrainer	34.76	597	295.01	635
Rockport	34.52	595	262.14	624
RedWing	38.03	605	255.81	612
<i>F ratios</i>				
Fitness	<1	<1	<1	<1
Shoe	19.75*	3.78*	40.25*	<1
Fitness X Shoe	3.79*	<1	3.16*	<1
Load	17.77*	59.01*	93.13*	9.11*
Fitness X Load	7.89*	19.93*	15.76*	4.67*
Shoe X Load	1.59	<1	<1	<1
Fitness X Shoe X Load	1.39	1.10	<1	1.10

Table D-16 - Metatarsal joint angle parameter means and *F* ratios during marching for women (*N* = 15)

Conditions	Variables			
	Mt1	Mt2	Mt3	Mt4
<u>Fitness</u>				
Low	31.85	552	282.11	595
Medium	32.85	553	232.05	582
High	34.52	556	316.83	599
<u>Shoe</u>				
Combat Boot	35.23 <sup>a</sup>	555	311.57 <sup>a b</sup>	595
Jungle Boot	40.17 <sup>b</sup>	561	358.82 <sup>a</sup>	601
Reebok	26.84 <sup>c</sup>	548	252.42 <sup>b c</sup>	585
Nike CrossTrainer	26.58 <sup>c</sup>	548	272.88 <sup>b c</sup>	587
Rockport	31.57 <sup>d</sup>	553	235.56 <sup>c</sup>	585
RedWing	36.33 <sup>a b</sup>	557	222.60 <sup>c</sup>	596
<u>No Load</u>				
Combat Boot	32.15 <sup>X</sup>	547 <sup>X</sup>	260.44 <sup>X</sup>	586 <sup>X</sup>
Jungle Boot	34.54	547	296.29	588
Reebok	39.36	553	343.74	593
Nike CrossTrainer	26.09	547	233.98	584
Rockport	25.27	536	248.05	577
RedWing	30.25	547	216.66	585
	35.63	550	211.26	588
<u>50 lb Load</u>				
Combat Boot	34.04 <sup>Y</sup>	561 <sup>Y</sup>	294.23 <sup>Y</sup>	598 <sup>Y</sup>
Jungle Boot	35.91	562	326.86	603
Reebok	40.99	569	373.89	609
Nike CrossTrainer	27.72	549	276.99	585
Rockport	27.88	558	297.71	598
RedWing	32.59	558	250.26	586
	37.03	564	233.94	604

Table D-16 - (continued)

	Variables			
	Mt1	Mt2	Mt3	Mt4
<u>F ratios</u>				
Fitness	<1	<1	1.28	<1
Shoe	50.45*	1.23	17.90*	1.94
Fitness X Shoe	6.12*	<1	2.97*	1.00
Load	85.90*	36.12*	26.68*	18.94*
Fitness X Load	26.68*	5.53	14.70*	<1
Shoe X Load	1.40	1.56	1.96	<1
Fitness X Shoe X Load	<1	<1	<1	<1

Table D-17 - Rearfoot movement parameter means and *F* ratios during marching for men (*N* = 15)

Conditions	Variables				
	Rf1	Rf2	Rf3	Rf4	Rf5
<u>Fitness</u>					
Low	-0.80	-7.69	126	7.84	-244.98
Medium	0.74	-7.09	128	7.82	-216.36
High	3.89	-3.31	142	7.17	-175.80
<u>Shoe</u>					
Combat Boot	0.55	-6.33 <sup>a</sup> <sub>b</sub>	134	8.64	-184.43
Jungle Boot	0.28	-6.77 <sup>a</sup> <sub>b</sub>	133	7.09	-213.66
Reebok	1.96	-5.82 <sup>a</sup> <sub>b</sub>	134	7.83	-191.46
Nike CrossTrainer	3.28	-4.54 <sup>a</sup>	129	7.71	-239.78
Rockport	0.07	-7.79 <sup>b</sup>	126	7.83	-244.94
RedWing	1.80	-4.84 <sup>a</sup>	136	6.52	-196.43
<u>No Load</u>					
Combat Boot	1.63	-5.55 <sup>X</sup>	128	7.11	-208.98
Jungle Boot	0.34	-6.33	126	6.58	-175.58
Reebok	0.82	-6.46	129	7.12	-240.24
Nike CrossTrainer	2.36	-5.17	133	7.62	-183.74
Rockport	3.49	-3.79	127	7.15	-224.50
RedWing	0.40	-7.30	121	7.69	-228.61
	2.26	-4.34	131	6.54	-200.83
<u>50 lb Load</u>					
Combat Boot	1.36	-6.04 <sup>X</sup> <sub>Y</sub>	136	7.80	-211.56
Jungle Boot	0.99	-6.11	149	9.53	-190.60
Reebok	0.28	-6.83	143	7.33	-205.58
Nike CrossTrainer	2.05	-5.95	133	7.95	-191.79
Rockport	3.31	-4.63	131	7.79	-245.33
RedWing	0.12	-7.65	125	7.66	-245.97
	1.47	-5.06	135	6.49	-198.78

Table D-17 - (continued)

	Variables				
	Rf1	Rf2	Rf3	Rf4	Rf5
70 lb Load	0.98	-6.44Y	132	7.90	-215.10
Combat Boot	0.30	-6.55	128	9.81	-187.13
Jungle Boot	-0.23	-7.02	128	6.83	-205.16
Reebok	1.45	-6.35	135	7.90	-198.86
Nike CrossTrainer	3.04	-5.20	129	8.20	-249.50
Rockport	-0.29	-8.39	133	8.13	-259.16
RedWing	1.67	-5.11	141	6.53	-189.69
<u>F ratios</u>					
Fitness	2.83	2.35	<1	<1	2.22
Shoe	2.36	3.82*	<1	1.58	2.97
Fitness X Shoe	1.11	1.03	<1	<1	<1
Load	5.44	9.19*	2.04	2.83	<1
Fitness X Load	1.21	1.35	<1	1.05	1.22
Shoe X Load	<1	1.86	<1	1.10	1.07
Fitness X Shoe X Load	1.01	1.00	<1	1.32	1.51

Table D-18 - Rearfoot movement parameter means and *F* ratios during marching for women (*N* = 15)

Conditions	Variables				
	Rf1	Rf2	Rf3	Rf4	Rf5
<b>Fitness</b>					
Low	2.26	-4.16	136	6.24	-163.18
Medium	1.17	-4.29	125	5.55	-155.01
High	2.35	-4.88	123	7.21	-170.77
<b>Shoe</b>					
Combat Boot	2.99	-2.91	130a	5.79ab	-143.36
Jungle Boot	2.14	-4.43	127a	6.54ab	-187.88
Reebok	1.43	-5.21	139b	6.62ab	-136.52
Nike CrossTrainer	2.87	-4.11	116c	6.95a	-185.35
Rockport	-0.40	-7.47	121c	7.10a	-180.43
RedWing	2.63	-2.61	133ab	5.15b	-146.06
<b>No Load</b>					
Combat Boot	1.88	-4.45	125	6.31	-160.86
Jungle Boot	2.96	-2.83	122	5.84	-132.83
Reebok	1.72	-4.42	122	6.10	-184.39
Nike CrossTrainer	1.69	-5.02	140	6.72	-136.38
Rockport	2.59	-4.15	109	6.73	-178.00
RedWing	-0.76	-7.93	120	7.23	-176.81
	3.24	-2.06	140	5.13	-156.76
<b>50 lb Load</b>					
Combat Boot	2.02	-4.45	131	6.40	-165.30
Jungle Boot	3.03	-2.98	139	5.74	-153.89
Reebok	2.57	-4.44	132	6.99	-191.38
Nike CrossTrainer	1.17	-5.39	139	6.51	-136.67
Rockport	3.18	-4.06	124	7.20	-193.63
RedWing	0.01	-6.96	123	6.95	-184.06
	2.08	-3.10	127	5.18	-135.35

Table D-18 - (continued)

	Variables				
	Rf1	Rf2	Rf3	Rf4	Rf5
<u>F ratios</u>					
Fitness	<1	<1	<1	<1	<1
Shoe	1.18	2.42	3.93*	4.59*	3.25
Fitness X Shoe	<1	<1	<1	<1	<1
Load	<1	2.31	2.37	<1	<1
Fitness X Load	1.31	1.59	1.46	<1	<1
Shoe X Load	<1	1.07	2.65	<1	<1
Fitness X Shoe X Load	<1	1.00	1.41	<1	<1



Appendix D

Table D-19 - Medial Hamstring parameter means and *F* ratios  
during marching for men (*N* = 15)

	EMG1	Variables EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	-182.9	7.1 <sub>A</sub>	0.0121 <sub>A</sub>
Medium	-196.3	2.5 <sub>A</sub>	0.0149 <sub>B</sub>
High	-206.9	93.7 <sub>B</sub>	0.0187 <sub>C</sub>
Shoe			
Combat Boot	-202.2 <sub>a</sub>	27.1	0.0155
Jungle Boot	-193.7 <sub>b</sub>	52.0	0.0164
Reebok	-200.7 <sub>a</sub>	21.5	0.0141
Nike CrossTrainer	-184.5 <sub>b</sub>	46.3	0.0150
Rockport	-187.3 <sub>b</sub>	30.0	0.0142
RedWing	-203.5 <sub>a</sub>	34.5	0.0161
No Load	-194.9	49.1	0.0152
Combat Boot	-192.0	37.0	0.0158
Jungle Boot	-189.3	83.7	0.0182
Reebok	-200.6	36.4	0.0136
Nike CrossTrainer	-176.4	64.5	0.0146
Rockport	-188.3	36.0	0.0131
RedWing	-212.8	36.9	0.0163
50 lb Load	-197.3	27.2	0.0141
Combat Boot	-208.8	14.1	0.0139
Jungle Boot	-209.0	36.8	0.0153
Reebok	-205.0	11.4	0.0146
Nike CrossTrainer	-181.0	42.0	0.0144
Rockport	-186.7	19.4	0.0125
RedWing	-193.4	43.6	0.0145
70 lb Load	-194.0	28.4	0.0162
Combat Boot	-195.8	27.2	0.0168
Jungle Boot	-185.5	30.3	0.0154
Reebok	-196.6	33.0	0.0142
Nike CrossTrainer	-185.9	16.7	0.0161
Rockport	-187.1	32.1	0.0169
RedWing	-203.3	23.8	0.0176
<u>F ratios</u>			
Fitness	1.89	16.28*	12.14*
Shoe	4.17*	1.51	1.08
Fitness X Shoe	1.45	2.77	3.55*
Load	<1	1.24	<1
Fitness X Load	<1	3.04	<1
Shoe X Load	2.21	<1	1.26
Fitness X Shoe X Load	1.34	<1	1.00

Table D-20 - Medial Hamstring parameter means and *F* ratios  
during marching for women (*N* = 15)

	EMG1	Variables EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	-187.9	-24.1	0.0094
Medium	-195.3	-6.7	0.0128
High	-202.9	-21.2	0.0144
Shoe			
Combat Boot	-201.3	-12.2	0.0144
Jungle Boot	-190.1	-13.0	0.0132
Reebok	-203.0	-18.4	0.0127
Nike CrossTrainer	-186.9	-26.9	0.0094
Rockport	-192.0	-28.4	0.0096
RedWing	-198.7	-6.3	0.0139
No Load	-195.3	-17.9	0.0116
Combat Boot	-198.4	-14.4	0.0129
Jungle Boot	-191.7	-15.0	0.0126
Reebok	-202.1	-17.7	0.0124
Nike CrossTrainer	-186.8	-27.3	0.0089
Rockport	-194.2	-26.7	0.0091
RedWing	-198.4	-6.4	0.0140
50 lb Load	-195.4	-16.9	0.0128
Combat Boot	-204.2	-1.0	0.0159
Jungle Boot	-188.4	-11.0	0.0139
Reebok	-203.9	-19.2	0.0129
Nike CrossTrainer	-187.0	-26.4	0.0100
Rockport	-189.5	-30.4	0.0101
RedWing	-198.9	-5.8	0.0138
<u><i>F</i> ratios</u>			
Fitness	1.03	<1	<1
Shoe	1.79	1.51	3.20
Fitness X Shoe	1.20	<1	<1
Load	1.81	<1	1.74
Fitness X Load	1.23	<1	1.75
Shoe X Load	1.28	<1	<1
Fitness X Shoe X Load	<1	<1	<1

Table D-21 - Rectus Femoris parameter means and  $F$  ratios during marching for men ( $N = 15$ )

	Variables		
	EMG1	EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	-40.3	144.6	0.0265
Medium	-42.6	140.2	0.0194
High	-88.6	172.5	0.0259
Shoe			
Combat Boot	-62.6	140.2	0.0227
Jungle Boot	-52.3	158.3	0.0229
Reebok	-64.9	149.9	0.0251
Nike CrossTrainer	-55.2	152.5	0.0257
Rockport	-47.9	163.3	0.0230
RedWing	-60.8	151.6	0.0246
No Load	-51.3	145.3	0.0178 $\times$
Combat Boot	-55.7	134.0	0.0173
Jungle Boot	-42.2	167.2	0.0176
Reebok	-55.0	142.2	0.0168
Nike CrossTrainer	-47.0	152.8	0.0212
Rockport	-45.5	145.0	0.0154
RedWing	-62.5	130.8	0.0186
50 lb Load	-65.7	146.7	0.0252 $\times\mathbf{Y}$
Combat Boot	-76.4	128.8	0.0232
Jungle Boot	-67.4	150.8	0.0286
Reebok	-71.4	144.9	0.0279
Nike CrossTrainer	-60.1	145.8	0.0267
Rockport	-58.2	153.5	0.0215
RedWing	-60.7	155.3	0.0240
70 lb Load	-55.4	165.3	0.0291 $\mathbf{Y}$
Combat Boot	-55.6	157.8	0.0276
Jungle Boot	-49.8	155.6	0.0236
Reebok	-68.8	162.3	0.0309
Nike CrossTrainer	-58.9	155.8	0.0293
Rockport	-40.0	191.4	0.0322
RedWing	-59.2	168.9	0.0311
<u>F ratios</u>			
Fitness	3.50	3.14	<1
Shoe	1.95	1.43	<1
Fitness X Shoe	1.26	1.30	<1
Load	1.35	1.66	5.67*
Fitness X Load	1.37	<1	3.56
Shoe X Load	<1	<1	<1
Fitness X Shoe X Load	1.01	<1	<1

Table D-22 - Rectus Femoris parameter means and *F* ratios during marching for women (*N* = 15)

	Variables		
	EMG1	EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	-58.4	106.9	0.0229
Medium	-68.4	139.2	0.0420
High	-56.8	109.6	0.0117
Shoe			
Combat Boot	-68.4	126.4	0.0341
Jungle Boot	-56.1	107.5	0.0186
Reebok	-61.6	108.9	0.0172
Nike CrossTrainer	-62.8	127.0	0.0326
Rockport	-61.6	128.0	0.0333
RedWing	-56.2	112.3	0.0165
No Load	-59.8	100.6	0.0147
Combat Boot	-61.0	102.9	0.0154
Jungle Boot	-60.1	102.1	0.0163
Reebok	-67.9	95.8	0.0150
Nike CrossTrainer	-55.6	100.9	0.0126
Rockport	-57.3	96.7	0.0146
RedWing	-55.6	105.1	0.0139
50 lb Load	-62.4	135.8	0.0358
Combat Boot	-75.9	150.0	0.0527
Jungle Boot	-52.0	112.9	0.0208
Reebok	-55.3	122.1	0.0193
Nike CrossTrainer	-68.4	150.2	0.0504
Rockport	-66.4	163.3	0.0544
RedWing	-56.8	119.4	0.0191
<u>F ratios</u>			
Fitness	<1	<1	<1
Shoe	<1	<1	1.24
Fitness X Shoe	<1	<1	<1
Load	<1	2.72	2.14
Fitness X Load	5.65	1.98	2.60
Shoe X Load	<1	<1	1.13
Fitness X Shoe X Load	2.05	1.32	2.17

Appendix D

Table D-23 - Anterior Tibialis parameter means and *F* ratios during marching for men (*N* = 15)

	Variables		
	EMG1	EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	-424.6	71.4	0.0576
Medium	-391.7	87.6	0.0429
High	-455.7	83.1	0.0578
Shoe			
Combat Boot	-421.2	70.5	0.0557
Jungle Boot	-424.5	79.2	0.0532
Reebok	-430.2	72.4	0.0510
Nike CrossTrainer	-416.3	78.9	0.0493
Rockport	-410.9	87.8	0.0517
RedWing	-444.8	90.3	0.0570
No Load	-430.7	81.1	0.0428
Combat Boot	-434.1	69.7	0.0437
Jungle Boot	-432.0	70.8	0.0384
Reebok	-440.0	76.8	0.0430
Nike CrossTrainer	-420.3	75.2	0.0409
Rockport	-422.8	88.2	0.0433
RedWing	-434.8	105.8	0.0478
50 lb Load	-420.2	76.0	0.0555
Combat Boot	-41.33	64.5	0.0628
Jungle Boot	-428.1	78.9	0.0549
Reebok	-421.3	62.7	0.0487
Nike CrossTrainer	-405.7	82.0	0.0472
Rockport	-406.6	86.3	0.0569
RedWing	-448.8	83.4	0.0625
70 lb Load	-422.7	84.4	0.0607
Combat Boot	-416.3	90.7	0.0607
Jungle Boot	-414.1	88.0	0.0666
Reebok	-429.2	77.8	0.0613
Nike CrossTrainer	-422.0	79.7	0.0597
Rockport	-403.4	89.0	0.0548
RedWing	-451.3	81.1	0.0611
<u>F ratios</u>			
Fitness	<1	<1	<1
Shoe	<1	2.31	1.94
Fitness X Shoe	<1	1.11	<1
Load	<1	1.11	4.42
Fitness X Load	<1	<1	3.33
Shoe X Load	<1	<1	1.60
Fitness X Shoe X Load	1.13	<1	<1

Table D-24 - Anterior Tibialis parameter means and *F* ratios during marching for women (*N* = 15)

	EMG1	Variables EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	-436.5	63.4	0.0506
Medium	-435.7	69.6	0.0350
High	-424.0	90.0	0.0327
Shoe			
Combat Boot	-449.5	71.3	0.0444
Jungle Boot	-439.9	72.4	0.0411
Reebok	-430.9	76.4	0.0358
Nike CrossTrainer	-416.6	70.6	0.0373
Rockport	-424.1	76.0	0.0371
RedWing	-430.8	79.7	0.0409
No Load	-441.3 $\bar{X}$	68.2 $\bar{X}$	0.0347
Combat Boot	-459.1	67.3	0.0387
Jungle Boot	-440.7	68.3	0.0342
Reebok	-439.7	63.1	0.0332
Nike CrossTrainer	-428.2	65.2	0.0313
Rockport	-429.0	73.4	0.0344
RedWing	-451.3	72.0	0.0361
50 lb Load	-422.6 $\bar{Y}$	80.7 $\bar{Y}$	0.0444
Combat Boot	-439.9	75.2	0.0502
Jungle Boot	-439.1	76.6	0.0479
Reebok	-422.2	89.8	0.0384
Nike CrossTrainer	-405.0	75.9	0.0433
Rockport	-418.6	78.9	0.0401
RedWing	-410.2	87.4	0.0457
<u><i>F</i> ratios</u>			
Fitness	<1	3.44	<1
Shoe	2.52	<1	1.16
Fitness X Shoe	1.01	1.46	<1
Load	20.37*	12.66*	<1
Fitness X Load	2.24	2.70	<1
Shoe X Load	<1	<1	<1
Fitness X Shoe X Load	1.08	<1	1.18

Appendix D

Table D-25 - Gastrocnemius/soleus parameter means and *F* ratios during marching for men (*N* = 5)

	Variables		
	EMG1	EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	127.9	479.7	0.0345
Medium	190.5	514.4	0.0269
High	119.2	529.7	0.0401
Shoe			
Combat Boot	144.2	511.6	0.0334
Jungle Boot	151.9	502.6	0.0328
Reebok	147.9	491.5	0.0326
Nike CrossTrainer	126.5	499.5	0.0367
Rockport	165.7	524.6	0.0328
RedWing	134.3	516.1	0.0353
No Load	135.4	479.4	0.0305
Combat Boot	140.7	498.0	0.0262
Jungle Boot	123.3	456.6	0.0299
Reebok	128.9	445.9	0.0303
Nike CrossTrainer	122.0	459.3	0.0348
Rockport	168.3	522.5	0.0291
RedWing	128.2	492.2	0.0328
50 lb Load	146.5	516.3	0.0374
Combat Boot	152.1	501.8	0.0363
Jungle Boot	162.7	520.7	0.0364
Reebok	145.0	507.1	0.0368
Nike CrossTrainer	107.7	517.7	0.0425
Rockport	165.6	525.4	0.0362
RedWing	145.3	526.9	0.0367
70 lb Load	153.4	527.5	0.0340
Combat Boot	139.9	534.8	0.0379
Jungle Boot	169.1	529.8	0.0323
Reebok	169.8	521.6	0.0308
Nike CrossTrainer	148.3	522.8	0.0333
Rockport	163.1	526.0	0.0331
RedWing	130.4	530.0	0.0364
<u>F ratios</u>			
Fitness	1.65	<1	2.07
Shoe	3.18	1.95	1.17
Fitness X Shoe	1.42	<1	<1
Load	<1	4.30	2.41
Fitness X Load	1.40	2.48	4.52*
Shoe X Load	<1	1.47	<1
Fitness X Shoe X Load	1.40	1.02	1.34

Table D-26 - Gastrocnemius/soleus parameter means and *F* ratios  
during marching for women (*N* = 15)

	EMG1	Variables EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	143.2 <sub>A</sub>	489.8	0.0254
Medium	-84.9 <sub>B</sub>	450.8	0.0487
High	166.8 <sub>A</sub>	472.8	0.0359
Shoe			
Combat Boot	61.8	463.1	0.0351
Jungle Boot	51.6	480.6	0.0380
Reebok	81.9	475.7	0.0402
Nike CrossTrainer	111.1	454.7	0.0307
Rockport	89.6	463.9	0.0333
RedWing	63.8	489.4	0.0417
No Load	92.7	471.8	0.0308
Combat Boot	61.9	474.8	0.0313
Jungle Boot	65.3	469.2	0.0316
Reebok	105.9	463.9	0.0299
Nike CrossTrainer	140.4	469.8	0.0277
Rockport	103.8	478.8	0.0307
RedWing	78.8	474.4	0.0338
50 lb Load	60.1	470.8	0.0424
Combat Boot	61.8	451.4	0.0389
Jungle Boot	37.9	492.0	0.0444
Reebok	58.0	487.6	0.0506
Nike CrossTrainer	81.7	439.7	0.0338
Rockport	73.7	447.1	0.0362
RedWing	48.8	504.3	0.0496
<u>F ratios</u>			
Fitness	7.60*	<1	2.21
Shoe	1.27	<1	3.29
Fitness X Shoe	3.95*	<1	1.49
Load	5.05	<1	2.83
Fitness X Load	2.73	<1	1.60
Shoe X Load	1.71	1.16	1.22
Fitness X Shoe X Load	1.47	1.17	<1



Table D-27 - Physiological parameter means and *F* ratios during marching for men (*N* = 15)

	Variables		
	M1	M2	M3
<u>Conditions</u>			
Fitness			
Low	20.77A	0.84	117.06
Medium	19.08B	0.81	105.71
High	16.20C	0.92	110.88
Shoe			
Combat Boot	18.14	0.87	110.91
Jungle Boot	18.32	0.91	112.84
Reebok	19.84	0.80	111.64
Nike CrossTrainer	18.70	0.85	107.36
Rockport	18.62	0.84	110.36
RedWing	18.41	0.88	114.51
No Load	16.54X	0.87	104.21X
Combat Boot	15.90	0.87	101.26
Jungle Boot	15.32	0.94	103.50
Reebok	17.55	0.79	102.26
Nike CrossTrainer	17.18	0.84	102.29
Rockport	16.86	0.82	106.29
RedWing	16.47	0.94	109.53
50 lb Load	19.08X Y	0.82	110.99Y
Combat Boot	19.30	0.82	114.10
Jungle Boot	18.89	0.84	114.26
Reebok	20.77	0.76	112.48
Nike CrossTrainer	18.85	0.85	103.89
Rockport	18.31	0.82	108.97
RedWing	18.35	0.85	111.84
70 lb Load	20.54Y	0.88	118.26Z
Combat Boot	19.46	0.90	115.94
Jungle Boot	20.81	0.94	119.89
Reebok	21.31	0.87	120.46
Nike CrossTrainer	20.08	0.86	115.12
Rockport	20.89	0.88	116.16
RedWing	20.66	0.85	122.16
<u>F ratios</u>			
Fitness	10.58*	2.43	2.12
Shoe	<1	<1	<1
Fitness X Shoe	1.96	1.61	<1
Load	7.08*	<1	8.98*
Fitness X Load	2.00	<1	4.00
Shoe X Load	<1	<1	<1
Fitness X Shoe X Load	1.25	1.74	<1

Table D-28 - Physiological parameter means and *F* ratios during marching for women (*N* = 15)

	Variables		
	M1	M2	M3
<u>Conditions</u>			
Fitness			
Low	16.80	0.85	107.81
Medium	16.51	0.84	118.36
High	16.24	0.84	112.71
Shoe			
Combat Boot	16.97	0.87	115.86
Jungle Boot	16.94	0.81	117.92
Reebok	16.31	0.82	112.53
Nike CrossTrainer	15.47	0.83	109.37
Rockport	17.06	0.85	112.19
RedWing	18.30	0.85	117.50
No Load	15.96x	0.84	103.07
Combat Boot	14.67	0.89	106.39
Jungle Boot	14.68	0.81	105.00
Reebok	13.54	0.84	103.26
Nike CrossTrainer	13.74	0.84	108.00
Rockport	14.36	0.83	105.33
RedWing	16.22	0.83	109.88
50 lb Load	18.50y	0.84	119.61
Combat Boot	18.48	0.87	122.76
Jungle Boot	19.14	0.87	127.95
Reebok	18.16	0.81	118.09
Nike CrossTrainer	16.27	0.83	115.41
Rockport	19.04	0.86	115.07
RedWing	19.91	0.86	118.40
<u>F ratios</u>			
Fitness	<1	<1	<1
Shoe	1.29	<1	<1
Fitness X Shoe	1.02	1.11	<1
Load	50.33*	3.23	7.23
Fitness X Load	<1	<1	1.06
Shoe X Load	<1	<1	<1
Fitness X Shoe X Load	<1	<1	1.31

**APPENDIX E**

**MEANS AND *F* RATIOS**  
**FOR**  
**OVERGROUND AND TREADMILL RUNNING PARAMETERS**

## KEY FOR ABBREVIATIONS OF VARIABLE NAMES

### *Vertical Ground Reaction Force Component*

- Fz1 -- first maximum force (N/kg of body mass)
- Fz2 -- relative time to first maximum force (%)
- Fz3 -- second maximum force (N/kg of body mass)
- Fz4 -- relative time to second maximum force (%)
- Fz5 -- average vertical force (N/kg of body mass)
- Fz6 -- total vertical impulse (N · s/kg of body mass)

### *Antero-posterior Ground Reaction Force Component*

- Fy1 -- maximum braking force (N/kg of body mass)
- Fy2 -- relative time to maximum braking force (%)
- Fy3 -- relative time to transition force (%)
- Fy4 -- maximum propelling force (N/kg of body mass)
- Fy5 -- relative time to maximum propelling force (%)

### *Medio-lateral Ground Reaction Force Component*

- Fx1 -- force excursions 0-30% of contact period (N/kg of body mass)
- Fx2 -- force excursions 0-100% of contact period (N/kg of body mass)

### *In-shoe Pressure*

- P1 -- peak heel pressure (kPa)
- P2 -- peak forefoot pressure (kPa)
- P3 -- total movement distance of center of pressure (cm)

### *Hip Angle*

- H1 -- maximum flexion (degrees)
- H2 -- maximum extension (degrees)
- H3 -- maximum flexion velocity (degrees/s)
- H4 -- time to maximum flexion velocity (ms)
- H5 -- maximum extension velocity (degrees/s)
- H6 -- time to maximum extension velocity (ms)

### *Knee Angle*

- K1 -- maximum flexion (degrees)
- K2 -- maximum extension (degrees)
- K3 -- maximum flexion velocity (degrees/s)
- K4 -- time to maximum flexion velocity (ms)
- K5 -- maximum extension velocity (degrees/s)
- K6 -- time to maximum extension velocity (ms)

***Ankle Angle***

- A1 -- maximum plantarflexion (degrees)
- A2 -- maximum dorsiflexion (degrees)
- A3 -- maximum plantarflexion velocity (degrees/s)
- A4 -- time to maximum plantarflexion velocity (ms)
- A5 -- maximum dorsiflexion velocity (degrees/s)
- A6 -- time to maximum dorsiflexion velocity (ms)

***Metatarsal Angle***

- Mt1 -- maximum flexion (degrees)
- Mt2 -- time to maximum flexion (ms)
- Mt3 -- maximum flexion velocity (degrees/s)
- Mt4 -- time to maximum flexion velocity (ms)

***Rearfoot Movement***

- Rf1 -- rearfoot angle at foot strike (degrees)
- Rf2 -- maximum rearfoot angle (degrees)
- Rf3 -- time to maximum rearfoot angle (ms)
- Rf4 -- total rearfoot motion (degrees)
- Rf5 -- maximum rearfoot velocity (degrees/s)

***Electromyography***

- EMG1 -- time to onset of muscle activity (ms)
- EMG2 -- time to end of muscle activity (ms)
- EMG3 -- area ( $V \cdot s$ )

***Physiological Parameters***

- M1 -- oxygen uptake (ml/kg of body mass/min)
- M2 -- RER (dimensionless)
- M3 -- heart rate (beats/min)

Table E-1 - Vertical ground reaction force component means and *F* ratios during running for men (*N* = 15)

Conditions	Variables					
	Fz1	Fz2	Fz3	Fz4	Fz5	Fz6
<u>Fitness</u>						
Low	13.07	9.88	23.55	45.79	13.64	4.96
Medium	11.39	8.65	23.31	41.63	13.58	4.84
High	13.51	11.01	22.66	40.74	12.99	4.59
<u>Shoe</u>						
Combat Boot	11.97a	8.52a	23.07	42.16	13.58	4.79
Jungle Boot	11.72a	9.29a	23.03	42.25	13.53	4.80
Reebok	13.28b	11.29b	23.24	40.08	13.16	4.80
Nike CrossTrainer	13.11b	10.22c	23.04	40.24	13.37	4.73
Rockport	13.05b	9.39a	23.32	41.16	13.46	4.82
RedWing	12.83ab	10.36c	23.34	50.42	13.34	4.83
<u>No Load</u>						
Combat Boot	12.88	9.88X	21.46X	45.19	12.41X	3.96X
Jungle Boot	12.30	8.56	21.64	40.83	12.80	3.97
Reebok	12.14	9.38	21.56	41.79	12.52	3.95
Nike CrossTrainer	13.25	11.61	21.72	40.05	12.17	4.05
Rockport	13.13	10.34	20.90	39.61	12.21	3.89
RedWing	13.17	8.77	21.53	41.60	12.49	3.96
	13.32	10.59	21.39	67.31	12.56	3.92
<u>50 lb Load</u>						
Combat Boot	12.61	8.65Y	23.37Y	40.81	13.40Y	4.93Y
Jungle Boot	11.82	5.94	23.25	42.06	13.57	4.95
Reebok	11.40	7.43	23.29	41.50	13.51	4.88
Nike CrossTrainer	13.31	10.49	23.36	40.02	13.07	4.95
Rockport	13.29	9.87	23.29	39.78	13.36	4.85
RedWing	13.08	8.85	23.44	40.81	13.47	4.95
	12.78	9.33	23.58	40.70	13.43	4.99

Table E-1 - (continued)

	Variables					
	Fz1	Fz2	Fz3	Fz4	Fz5	Fz6
70 lb Load	12.48	11.01Y	24.69Z	41.91	14.19Z	5.44Z
Combat Boot	11.79	11.08	24.62	42.88	14.32	5.44
Jungle Boot	11.61	11.06	24.48	42.79	14.18	5.50
Reebok	13.30	11.78	24.60	40.33	13.89	5.33
Nike CrossTrainer	12.92	10.44	24.69	41.22	14.27	5.40
Rockport	12.89	10.54	24.87	41.02	14.26	5.44
RedWing	12.40	11.17	24.86	43.23	14.21	5.52
<u>F ratios</u>						
Fitness	<1	<1	2.06	1.03	<1	<1
Shoe	4.12*	21.41*	<1	1.51	1.59	1.32
Fitness X Shoe	1.96	2.45	<1	1.08	<1	<1
Load	2.46	12.88*	62.56*	<1	35.48*	246.94*
Fitness X Load	1.67	4.79	11.77*	<1	10.15*	97.07*
Shoe X Load	<1	1.14	1.46	1.09	<1	1.91
Fitness X Shoe X Load	<1	1.04	<1	1.02	1.10	1.06

Table E-2 - Vertical ground reaction force component means and *F* ratios during running for women (*N* = 15)

Conditions	Variables					
	Fz1	Fz2	Fz3	Fz4	Fz5	Fz6
<u>Fitness</u>						
Low	12.93	8.17	23.62	44.46	14.56	4.60
Medium	13.48	10.95	23.66	43.29	14.37	4.36
High	12.96	9.36	24.80	45.00	14.64	4.69
<u>Shoe</u>						
Combat Boot	13.08	8.08 <sup>a</sup>	24.00	44.67 <sup>a b</sup>	14.76	4.56
Jungle Boot	12.22	9.46 <sup>b</sup>	23.80	44.77 <sup>a b</sup>	14.36	4.55
Reebok	13.69	11.25 <sup>c</sup>	24.49	43.28 <sup>b</sup>	14.44	4.54
Nike CrossTrainer	13.59	9.83 <sup>b</sup>	24.03	43.05 <sup>b</sup>	14.51	4.52
Rockport	12.92	9.06 <sup>b</sup>	23.88	44.13 <sup>a b</sup>	14.41	4.55
RedWing	13.25	9.28 <sup>b</sup>	23.95	45.59 <sup>a</sup>	14.67	4.60
<u>No Load</u>						
Combat Boot	13.14	9.87 <sup>x</sup>	22.79 <sup>x</sup>	45.13 <sup>x</sup>	13.86 <sup>x</sup>	4.00 <sup>x</sup>
Jungle Boot	13.40	8.50	23.05	45.45	14.27	4.12
Reebok	12.13	9.82	22.66	46.01	13.80	3.99
Nike CrossTrainer	13.68	11.42	23.09	43.97	13.77	3.96
Rockport	13.55	9.97	22.60	43.93	13.70	3.95
RedWing	12.67	9.20	22.50	45.17	13.62	3.99
	13.40	9.86	22.83	46.22	14.01	4.01
<u>50 lb Load</u>						
Combat Boot	13.12	9.11 <sup>y</sup>	25.26 <sup>y</sup>	43.38 <sup>y</sup>	15.18 <sup>y</sup>	5.10 <sup>y</sup>
Jungle Boot	12.76	7.67	24.94	43.89	15.24	5.00
Reebok	12.32	8.91	24.94	43.53	14.92	5.11
Nike CrossTrainer	13.69	11.07	25.89	42.60	15.10	5.12
Rockport	13.63	9.69	25.46	42.17	15.92	5.08
RedWing	13.17	8.62	25.27	43.08	15.19	5.10
	13.11	8.71	25.02	44.97	15.34	5.19



Table E-2 - (continued)

	Variables					
	Fz1	Fz2	Fz3	Fz4	Fz5	Fz6
<u>F ratios</u>						
Fitness	<1	2.86	<1	<1	<1	4.30
Shoe	2.36	4.94*	1.85	6.35*	<1	1.17
Fitness X Shoe	<1	2.40	<1	<1	<1	2.42
Load	<1	18.44*	49.99*	17.48*	29.63*	236.69*
Fitness X Load	<1	3.75	17.33*	9.98*	19.35*	16.57*
Shoe X Load	1.86	1.48	1.45	<1	1.75	2.15
Fitness X Shoe X Load	1.15	<1	1.71	<1	1.70	1.21

Table E-3 - Antero-posterior ground reaction force component means and *F* ratios during running for men (*N* = 15)

Conditions	Variables				
	Fy1	Fy2	Fy3	Fy4	Fy5
<u>Fitness</u>					
Low	-2.42	23.12	50.02	2.12	72.63
Medium	-1.99	22.52	50.82	1.88	72.52
High	-2.21	22.51	48.53	2.02	70.47
<u>Shoe</u>					
Combat Boot	-2.22	22.61a	50.62	2.06	71.99
Jungle Boot	-2.10	23.12a	50.22	1.98	72.21
Reebok	-2.21	22.91a	48.90	1.97	71.33
Nike CrossTrainer	-2.21	21.84a	48.59	1.99	71.91
Rockport	-2.24	22.28a	50.80	2.04	71.92
RedWing	-2.26	23.55b	49.61	2.00	71.86
<u>No Load</u>					
Combat Boot	-2.07	22.97	50.09	1.78x	72.13
Jungle Boot	-2.12	22.64	50.35	1.84	72.10
Reebok	-1.99	22.95	50.25	1.81	72.66
Nike CrossTrainer	-2.07	23.54	49.53	1.74	71.41
Rockport	-2.05	22.33	48.95	1.73	72.26
RedWing	-2.09	21.81	50.66	1.82	72.51
	-2.10	24.53	50.81	1.73	72.83
<u>50 lb Load</u>					
Combat Boot	-2.19	22.64	49.34	1.95x y	71.53
Jungle Boot	-2.21	23.03	50.73	1.95	71.56
Reebok	-2.07	23.10	49.56	1.94	71.76
Nike CrossTrainer	-2.22	22.98	48.29	1.98	70.90
Rockport	-2.17	21.58	48.25	1.91	71.68
RedWing	-2.23	22.18	50.66	1.97	71.59
	-2.26	22.96	48.61	1.97	71.58

Table E-3 - (continued)

	Variables				
	Fy1	Fy2	Fy3	Fy4	Fy5
70 lb Load	-2.32	22.55	49.94	2.14Y	71.89
Combat Boot	-2.29	22.17	50.77	2.20	71.99
Jungle Boot	-2.24	23.30	50.91	2.13	72.22
Reebok	-2.37	22.20	48.86	2.06	71.32
Nike CrossTrainer	-2.31	21.65	48.57	2.16	72.20
Rockport	-2.35	22.85	51.09	2.16	71.84
RedWing	-2.37	23.16	49.94	2.14	71.79
<u>F ratios</u>					
Fitness	2.31	2.50	2.38	<1	2.08
Shoe	1.94	4.65*	2.82	1.06	<1
Fitness X Shoe	<1	<1	<1	<1	<1
Load	2.65	1.52	1.82	10.86*	<1
Fitness X Load	2.36	4.18	1.55	3.14	<1
Shoe X Load	<1	1.66	<1	1.06	<1
Fitness X Shoe X Load	<1	1.03	<1	<1	<1

Table E-4 - Antero-posterior ground reaction force component means and *F* ratios during running for women (*N* = 15)

Conditions	Variables				
	Fy1	Fy2	Fy3	Fy4	Fy5
Fitness					
Low	-2.68	23.20	51.14	2.20	75.23
Medium	-1.35	28.03	55.51	1.30	78.54
High	-2.68	22.15	50.03	2.40	74.47
Shoe					
Combat Boot	-2.29	24.38	53.30	1.99	76.36
Jungle Boot	-2.11	25.15	53.09	1.96	75.97
Reebok	-2.27	24.64	51.66	1.95	75.26
Nike CrossTrainer	-2.21	23.39	50.88	1.97	75.76
Rockport	-2.20	24.34	52.79	2.00	76.11
RedWing	-2.35	24.87	51.64	1.95	77.02
No Load	-2.09X	24.92	52.15	1.85X	76.23
Combat Boot	-2.18	24.79	54.28	1.92	76.36
Jungle Boot	-1.97	25.72	53.10	1.85	76.49
Reebok	-2.08	25.02	51.92	1.81	75.45
Nike CrossTrainer	-2.02	23.74	50.84	1.82	75.77
Rockport	-2.00	24.87	52.92	1.88	76.11
RedWing	-2.28	25.38	49.85	1.83	77.19
50 lb Load	-2.39Y	24.00	52.30	2.09Y	75.93
Combat Boot	-2.30	23.96	52.32	2.07	76.36
Jungle Boot	-2.25	24.57	53.08	2.04	75.45
Reebok	-2.46	24.25	51.41	2.08	75.06
Nike CrossTrainer	-2.40	23.04	50.93	2.13	75.75
Rockport	-2.39	23.81	52.67	2.12	76.10
RedWing	-2.53	24.36	53.43	2.08	76.84

Table E-4 - (continued)

	Variables				
	Fy1	Fy2	Fy3	Fy4	Fy5
<u>F ratios</u>					
Fitness	<1	1.50	2.48	2.73	<1
Shoe	2.98	1.81	<1	<1	1.30
Fitness X Shoe	7.43*	2.44	1.84	10.33*	<1
Load	46.40*	1.64	<1	26.10*	<1
Fitness X Load	12.63*	1.24	<1	8.71*	2.35
Shoe X Load	2.74	<1	2.34	1.82	<1
Fitness X Shoe X Load	2.16	2.39	1.90	<1	<1

Table E-5 - Medio-lateral ground reaction force component means and *F* ratios during running for men (*N* = 15)

Variables	Variables	
	Fx1	Fx2
<u>Conditions</u>		
Fitness		
Low	3.63	5.87
Medium	3.18	5.24
High	4.26	6.41
Shoe		
Combat Boot	4.27 <sub>a</sub>	6.68 <sub>a</sub>
Jungle Boot	4.09 <sub>a</sub>	6.33 <sub>a</sub>
Reebok	2.56 <sub>b</sub>	4.48 <sub>b</sub>
Nike CrossTrainer	2.59 <sub>b</sub>	4.60 <sub>b</sub>
Rockport	2.76 <sub>b</sub>	4.69 <sub>b</sub>
RedWing	5.88 <sub>c</sub>	8.26 <sub>c</sub>
No Load	3.86	5.96
Combat Boot	4.73	7.19
Jungle Boot	4.30	6.51
Reebok	2.62	4.56
Nike CrossTrainer	2.60	4.49
Rockport	2.68	4.47
RedWing	6.22	8.58
50 lb Load	3.65	5.74
Combat Boot	3.92	6.24
Jungle Boot	4.20	6.42
Reebok	2.42	4.29
Nike CrossTrainer	2.60	4.57
Rockport	2.76	4.71
RedWing	5.96	8.20
70 lb Load	3.57	5.81
Combat Boot	4.16	6.61
Jungle Boot	3.76	6.07
Reebok	2.64	4.60
Nike CrossTrainer	2.58	4.74
Rockport	2.82	4.89
RedWing	5.46	7.99
<u>F-ratios</u>		
Fitness	1.04	2.86
Shoe	18.20*	17.19*
Fitness X Shoe	2.76*	1.93
Load	<1	<1
Fitness X Load	3.06	1.75
Shoe X Load	1.47	1.76
Fitness X Shoe X Load	1.35	1.52

Table E-6 - Medio-lateral ground reaction force component means and *F* ratios during running for women (*N* = 15)

	Variables	
	Fx1	Fx2
<u>Conditions</u>		
Fitness		
Low	5.04	8.04
Medium	1.48	2.58
High	4.85	7.52
Shoe		
Combat Boot	5.85 <sub>a</sub>	8.76 <sub>a</sub>
Jungle Boot	3.81 <sub>a b</sub>	6.05 <sub>b</sub>
Reebok	2.23 <sub>b</sub>	4.17 <sub>c</sub>
Nike CrossTrainer	2.41 <sub>b</sub>	4.56 <sub>c</sub>
Rockport	2.62 <sub>b</sub>	4.38 <sub>c</sub>
RedWing	5.83 <sub>a</sub>	8.33 <sub>a</sub>
No Load	3.99	6.27
Combat Boot	6.71	9.82
Jungle Boot	3.84	6.06
Reebok	2.46	4.43
Nike CrossTrainer	2.54	4.67
Rockport	2.67	4.35
RedWing	5.73	8.29
50 lb Load	3.59	5.81
Combat Boot	4.97	7.71
Jungle Boot	3.78	6.03
Reebok	2.01	3.91
Nike CrossTrainer	2.27	4.44
Rockport	2.56	4.40
RedWing	5.92	8.37
<u>F ratios</u>		
Fitness	2.87	1.04
Shoe	12.66*	11.75*
Fitness X Shoe	6.26*	7.02*
Load	3.28	1.92
Fitness X Load	2.40	1.51
Shoe X Load	1.24	1.07
Fitness X Shoe X Load	1.58	1.19

Table E-7 - In-shoe pressure parameter means and *F* ratios during running for men (*N* = 15)

	Variables		
	P1	P2	P3
<u>Conditions</u>			
Fitness			
Low	585.96	541.86	22.59
Medium	540.24	460.39	21.53
High	590.58	500.12	23.01
Shoe			
Combat Boot	591.58	526.27	22.00
Jungle Boot	657.48	596.07	22.36
Reebok	596.62	599.45	22.70
Nike CrossTrainer	385.04	451.09	24.01
Rockport	576.64	543.06	21.65
RedWing	677.44	472.28	21.70
No Load	522.60	544.25	22.57
Combat Boot	564.74	520.91	22.18
Jungle Boot	585.93	593.25	23.25
Reebok	662.36	666.97	22.13
Nike CrossTrainer	390.51	494.73	24.20
Rockport	514.74	563.16	22.53
RedWing	462.64	455.20	21.76
50 lb Load	669.98	526.65	22.44
Combat Boot	652.52	554.74	21.96
Jungle Boot	693.18	620.15	20.71
Reebok	530.10	469.51	23.43
Nike CrossTrainer	371.51	382.49	24.74
Rockport	723.22	577.21	22.54
RedWing	1037.00	554.86	21.40
70 lb Load	539.55	518.82	22.29
Combat Boot	553.66	502.40	21.88
Jungle Boot	683.12	574.41	23.23
Reebok	606.67	662.61	22.48
Nike CrossTrainer	393.08	476.06	23.09
Rockport	491.95	488.81	20.87
RedWing	502.01	404.34	21.96
<u>F-ratios</u>			
Fitness	1.01	<1	<1
Shoe	1.44	1.75	1.68
Fitness X Shoe	1.21	1.02	<1
Load	<1	2.53	<1
Fitness X Load	1.46	1.22	1.24
Shoe X Load	1.71	1.30	<1
Fitness X Shoe X Load	<1	1.05	<1



Table E-8 - In-shoe pressure parameter means and *F* ratios during running for women (*N* = 15)

	Variables		
	P1	P2	P3
<u>Conditions</u>			
Fitness			
Low	497.62	541.40	19.53
Medium	413.88	438.18	19.67
High	587.96	566.19	20.57
Shoe			
Combat Boot	531.44 <sub>a</sub>	531.45	19.71 <sub>a</sub>
Jungle Boot	507.15 <sub>a</sub>	548.73	20.31 <sub>b</sub>
Reebok	360.11 <sub>b</sub>	499.72	21.38 <sub>b</sub>
Nike CrossTrainer	506.32 <sub>a</sub>	501.09	19.60 <sub>a</sub>
Rockport	536.05 <sub>a</sub>	551.39	18.97 <sub>a</sub>
RedWing	509.78 <sub>a</sub>	467.88	19.22 <sub>a</sub>
No Load	447.13 <sub>x</sub>	452.96	19.86
Combat Boot	480.68	466.76	19.03
Jungle Boot	503.33	524.13	20.18
Reebok	337.09	410.73	22.68
Nike CrossTrainer	429.60	485.02	19.50
Rockport	480.60	442.99	18.53
RedWing	451.49	394.59	19.27
50 lb Load	536.48 <sub>y</sub>	589.96	19.87
Combat Boot	582.19	620.40	20.54
Jungle Boot	510.97	579.47	20.44
Reebok	383.13	597.62	20.10
Nike CrossTrainer	583.05	518.77	19.69
Rockport	591.49	659.79	19.42
RedWing	568.07	557.96	19.16
<u>F ratios</u>			
Fitness	<1	<1	<1
Shoe	4.11*	2.32	3.81*
Fitness X Shoe	1.21	1.03	<1
Load	16.23*	<1	<1
Fitness X Load	1.13	1.41	<1
Shoe X Load	1.43	1.27	<1
Fitness X Shoe X Load	<1	<1	<1

Table E-9 - Hip angle parameter means and *F* ratios during running for men (*N* = 15)

Conditions	Variables					
	H1	H2	H3	H4	H5	H6
<u>Fitness</u>						
Low	32.04	1.29	133.70	103	229.29	517
Medium	37.47	0.29	113.08	54	238.95	525
High	29.09	-0.72	102.04	86	223.23	514
<u>Shoe</u>						
Combat Boot	33.22	0.40	123.25	77	232.08	521
Jungle Boot	32.89	-0.44	117.35	76	229.93	518
Reebok	31.95	-1.64	109.59	82	238.28	522
Nike CrossTrainer	32.66	0.88	113.77	82	221.53	509
Rockport	33.39	1.06	114.74	82	226.80	516
RedWing	33.35	1.27	118.44	87	235.86	526
<u>No Load</u>						
Combat Boot	22.41X	-2.45X	123.68	58X	200.82X	518
Jungle Boot	22.94	-2.12	136.94	55	200.31	521
Reebok	22.69	-2.85	132.81	60	204.56	511
Nike CrossTrainer	22.81	-4.35	112.11	48	211.92	525
Rockport	21.53	-1.99	119.25	71	191.35	510
RedWing	21.77	-2.28	113.96	49	193.91	514
	22.82	-1.49	125.82	61	205.03	525
<u>50 lb Load</u>						
Combat Boot	35.60Y	1.08Y	114.15	81X Y	237.15Y	518
Jungle Boot	35.40	0.85	123.72	74	240.15	523
Reebok	35.12	0.10	116.88	72	231.23	516
Nike CrossTrainer	34.60	1.11	105.03	90	245.89	528
Rockport	35.24	1.51	108.77	98	226.52	507
RedWing	36.80	1.73	118.69	76	236.08	513
	36.34	1.93	111.03	76	243.74	522

Table E-9 - (continued)

	Variables					
	H1	H2	H3	H4	H5	H6
70 lb Load	40.48Z	2.39Y	111.31	103Y	253.01Y	520
Combat Boot	41.31	2.51	109.07	101	255.77	519
Jungle Boot	40.01	1.06	103.64	95	251.87	527
Reebok	37.61	0.29	111.86	103	254.62	514
Nike CrossTrainer	41.22	3.12	113.30	96	246.71	510
Rockport	41.61	3.74	111.57	121	250.41	523
RedWing	40.88	3.54	118.48	122	258.82	529
<u>F ratios</u>						
Fitness	1.27	<1	1.73	<1	<1	<1
Shoe	<1	1.50	<1	<1	2.79	2.64
Fitness X Shoe	<1	<1	1.40	<1	<1	<1
Load	132.83*	24.16*	1.93	14.79*	20.55*	<1
Fitness X Load	58.53*	5.36*	1.76	3.39	11.78*	<1
Shoe X Load	<1	<1	1.74	<1	1.04	1.29
Fitness X Shoe X Load	1.05	<1	1.76	<1	1.11	1.03

Table E-10 - Hip angle parameter means and *F* ratios during running for women (*N* = 15)

Conditions	Variables					
	H1	H2	H3	H4	H5	H6
<u>Fitness</u>						
Low	22.16	-13.85	134.82	62	249.54	512
Medium	31.11	-1.49	119.42	59	229.21	504
High	23.55	-11.38	170.49	51	294.81	530
<u>Shoe</u>						
Combat Boot	24.96	-8.71	140.68	56	250.31	508
Jungle Boot	25.65	-8.08	137.97	51	254.50	505
Reebok	25.89	-9.31	147.71	55	266.06	518
Nike CrossTrainer	26.04	-8.69	140.12	54	259.12	521
Rockport	25.20	-9.64	135.11	60	254.20	513
RedWing	25.61	-9.44	149.43	67	264.97	528
<u>No Load</u>						
Combat Boot	18.46	-11.08	147.42	53	237.03	520
Jungle Boot	19.18	-11.32	151.36	62	229.56	510
Reebok	18.55	-10.38	136.21	45	228.01	509
Nike CrossTrainer	17.45	-11.88	152.41	51	249.99	525
Rockport	18.11	-11.41	142.59	53	242.56	524
RedWing	18.67	-11.02	146.25	56	231.98	519
	18.71	-10.54	156.24	53	241.54	536
<u>50 lb Load</u>						
Combat Boot	32.52	-6.91	136.25	61	278.81	511
Jungle Boot	30.73	-6.09	130.00	51	271.06	506
Reebok	32.75	-5.78	139.73	58	280.98	501
Nike CrossTrainer	33.39	-7.02	143.53	58	280.35	511
Rockport	33.98	-5.96	137.65	56	275.68	518
RedWing	31.74	-8.26	123.97	64	276.42	508
	32.51	-8.35	142.62	81	288.39	521

Table E-10 - (continued)

	Variables					
	H1	H2	H3	H4	H5	H6
<u>F ratios</u>						
Fitness	7.31	1.96	2.31	<1	7.79	1.59
Shoe	<1	<1	<1	1.37	<1	2.21
Fitness X Shoe	1.97	2.01	1.65	<1	2.66	<1
Load	7.24	9.35	<1	2.03	11.06	1.89
Fitness X Load	22.26*	4.73	<1	<1	4.76	1.72
Shoe X Load	<1	1.87	<1	2.34	<1	<1
Fitness X Shoe X Load	<1	<1	<1	1.28	<1	1.30

Table E-11 - Knee angle parameter means and *F* ratios during running for men (*N* = 15)

Conditions	Variables					
	K1	K2	K3	K4	K5	K6
<u>Fitness</u>						
Low	38.25	8.47	300.56	160	348.30	438
Medium	48.35	15.68	306.23	114	352.21	441
High	40.13	10.54	330.89	165	343.97	422
<u>Shoe</u>						
Combat Boot	42.58	12.07	330.09 <sup>a</sup>	160	353.49	434
Jungle Boot	42.25	11.04	314.98 <sup>a,b</sup>	159	348.14	430
Reebok	42.18	10.51	301.17 <sup>b</sup>	134	346.92	443
Nike CrossTrainer	41.42	11.03	302.36 <sup>b</sup>	109	343.78	428
Rockport	42.72	11.11	308.17 <sup>b</sup>	161	347.55	429
RedWing	42.69	13.31	316.53 <sup>a,b</sup>	153	349.28	437
<u>No Load</u>						
Combat Boot	43.42 <sup>X</sup>	9.18 <sup>X</sup>	332.09 <sup>X</sup>	84 <sup>X</sup>	342.89	424
Jungle Boot	44.09	11.31	359.85	85	352.92	432
Reebok	43.96	8.30	340.40	85	342.94	415
Nike CrossTrainer	42.14	8.37	317.54	57	344.90	429
Rockport	43.02	8.59	318.65	82	328.81	418
RedWing	43.69	8.39	319.19	98	337.79	419
	43.44	9.82	335.15	95	350.29	433
<u>50 lb Load</u>						
Combat Boot	41.49 <sup>Y</sup>	11.28 <sup>X,Y</sup>	304.24 <sup>Y</sup>	140 <sup>X,Y</sup>	347.43	437
Jungle Boot	41.50	10.15	319.06	161	348.43	438
Reebok	41.07	9.72	305.84	157	347.85	431
Nike CrossTrainer	41.73	10.07	293.04	132	347.17	457
Rockport	40.32	11.16	296.91	103	347.23	430
RedWing	42.26	11.88	301.50	160	345.66	430
	42.06	14.38	308.14	126	348.22	436

Table E-11 - (continued)

	Variables					
	K1	K2	K3	K4	K5	K6
70 lb Load	42.05X Y	14.06Y	301.47Y	212Y	354.19	439
Combat Boot	42.14	14.59	321.36	234	359.12	433
Jungle Boot	41.85	14.55	310.82	228	353.20	442
Reebok	42.67	12.90	294.41	208	348.50	443
Nike CrossTrainer	40.91	13.34	291.53	142	355.28	435
Rockport	42.23	13.06	283.82	225	359.20	440
RedWing	42.55	15.96	306.31	238	349.35	444
<u>F ratios</u>						
Fitness	2.91	1.58	<1	<1	<1	<1
Shoe	1.08	2.08	5.33*	2.49	1.19	1.66
Fitness X Shoe	1.68	1.14	1.12	<1	<1	<1
Load	6.92*	11.28*	27.32*	8.97*	2.67	4.81
Fitness X Load	1.78	5.19*	7.14*	5.33*	<1	1.90
Shoe X Load	<1	1.05	<1	1.94	2.63	1.64
Fitness X Shoe X Load	1.04	1.10	1.12	1.43	1.51	1.42

Table E-12 - Knee angle parameter means and *F* ratios during running for women (*N* = 15)

Conditions	Variables					
	K1	K2	K3	K4	K5	K6
Fitness						
Low	36.68	4.04	313.74	101	362.81	441
Medium	39.93	11.76	306.50	117	357.54	406
High	39.76	6.29	357.39	57	368.63	431
Shoe						
Combat Boot	38.94	7.12	333.57	93	362.17	414
Jungle Boot	38.66	7.36	331.59	88	366.14	418
Reebok	38.49	8.50	326.87	97	371.09	442
Nike CrossTrainer	38.94	7.16	313.59	88	358.27	429
Rockport	38.97	7.19	313.45	96	357.29	428
RedWing	38.67	7.08	335.98	88	363.97	427
No Load	39.30	6.92X	339.33X	56	363.35	419X
Combat Boot	39.56	7.62	353.47	50	363.31	403
Jungle Boot	39.23	6.44	343.45	51	375.56	407
Reebok	38.61	6.86	340.32	55	364.19	456
Nike CrossTrainer	39.38	7.43	322.59	57	356.44	425
Rockport	39.81	7.12	327.19	64	356.66	413
RedWing	39.14	6.07	350.61	58	363.37	417
50 lb Load	38.27	7.82Y	312.70Y	126	362.76	433Y
Combat Boot	38.31	6.62	315.89	131	361.02	425
Jungle Boot	38.09	8.29	319.73	125	356.71	430
Reebok	38.39	9.77	314.91	134	376.46	430
Nike CrossTrainer	38.49	6.91	304.59	119	359.90	432
Rockport	38.13	7.25	299.71	128	357.91	443
RedWing	38.20	8.10	321.36	118	364.57	438



Table E-12 - (continued)

	Variables					
	K1	K2	K3	K4	K5	K6
<u>F ratios</u>						
Fitness	1.34	1.65	1.25	<1	<1	1.18
Shoe	<1	<1	1.34	<1	<1	2.03
Fitness X Shoe	1.08	<1	1.14	<1	<1	1.04
Load	1.88	17.77*	15.22*	4.12	<1	85.67*
Fitness X Load	1.68	2.76	3.84	1.52	<1	5.85
Shoe X Load	<1	1.72	<1	<1	<1	1.95
Fitness X Shoe X Load	1.00	2.37	<1	1.21	1.11	1.43

Table E-13 - Ankle angle parameter means and *F* ratios during running for men (*N* = 15)

Conditions	Variables					
	A1	A2	A3	A4	A5	A6
<u>Fitness</u>						
Low	16.54	-15.28	308.00	286	-194.79	95
Medium	9.86	-22.02	309.14	283	-197.17	102
High	17.57	-16.45	300.52	284	-188.28	91
<u>Shoe</u>						
Combat Boot	13.80 <sup>ab</sup>	-17.87 <sup>abc</sup>	306.82 <sup>a</sup>	272 <sup>a</sup>	-201.28 <sup>a</sup>	93
Jungle Boot	15.52 <sup>a</sup>	-16.99 <sup>ab</sup>	313.29 <sup>a</sup>	271 <sup>a</sup>	-206.30 <sup>a</sup>	91
Reebok	10.64 <sup>b</sup>	-20.43 <sup>c</sup>	288.79 <sup>b</sup>	285 <sup>ab</sup>	-185.94 <sup>b</sup>	99
Nike CrossTrainer	17.26 <sup>a</sup>	-17.71 <sup>abc</sup>	322.57 <sup>c</sup>	298 <sup>b</sup>	-179.42 <sup>b</sup>	96
Rockport	15.58 <sup>a</sup>	-19.39 <sup>bc</sup>	323.04 <sup>c</sup>	295 <sup>ab</sup>	-186.87 <sup>b</sup>	98
RedWing	14.36 <sup>ab</sup>	-15.63 <sup>a</sup>	279.43 <sup>b</sup>	285 <sup>ab</sup>	-200.53 <sup>a</sup>	98
<u>No Load</u>						
Combat Boot	13.02 <sup>X</sup>	-17.83	314.60 <sup>X</sup>	256 <sup>X</sup>	-206.47 <sup>X</sup>	85 <sup>X</sup>
Jungle Boot	12.29	-17.99	317.61	242	-219.08	80
Reebok	13.38	-16.75	318.19	239	-217.43	80
Nike CrossTrainer	9.37	-20.43	296.43	260	-198.61	89
Rockport	15.59	-17.76	332.40	277	-192.32	83
RedWing	14.33	-19.67	333.69	263	-199.39	89
	13.61	-14.73	286.56	254	-211.58	88
<u>50 lb Load</u>						
Combat Boot	15.17 <sup>Y</sup>	-17.64	299.76 <sup>Y</sup>	290 <sup>Y</sup>	-190.02 <sup>Y</sup>	97 <sup>Y</sup>
Jungle Boot	14.10	-17.55	296.97	276	-196.99	96
Reebok	16.18	-16.61	308.67	280	-201.01	93
Nike CrossTrainer	11.02	-20.26	289.06	285	-182.45	100
Rockport	18.16	-17.15	313.72	313	-174.50	97
RedWing	17.49	-19.01	314.55	296	-184.00	100
	14.73	-15.51	274.71	289	-200.53	96

Table E-13 - (continued)

	Variables					
	A1	A2	A3	A4	A5	A6
70 lb Load	15.55Y	-18.40	303.71Y	307Y	-184.29Y	105Y
Combat Boot	15.01	-18.07	305.88	287	-187.78	102
Jungle Boot	16.82	-17.58	313.43	282	-201.40	100
Reebok	11.43	-20.60	281.56	308	-177.91	107
Nike CrossTrainer	18.02	-18.21	321.61	335	-171.43	107
Rockport	16.92	-19.49	320.88	317	-177.21	106
RedWing	14.75	-16.64	277.02	310	-189.47	111
<u>F ratios</u>						
Fitness	2.71	3.61	<1	<1	<1	<1
Shoe	5.93*	7.72*	38.11*	4.23*	16.09*	1.53
Fitness X Shoe	2.23	3.72*	<1	<1	1.11	<1
Load	17.71*	3.15	26.70*	40.01*	21.00*	19.93*
Fitness X Load	5.25*	1.92	5.74*	17.90*	11.67*	10.30*
Shoe X Load	1.10	1.67	<1	<1	2.89	<1
Fitness X Shoe X Load	1.04	1.18	<1	1.35	1.85	1.00

Table E-14 - Ankle angle parameter means and *F* ratios during running for women (*N* = 15)

Conditions	Variables					
	A1	A2	A3	A4	A5	A6
<b>Fitness</b>						
Low	12.94	-17.30	324.58	285	-204.58	100
Medium	15.00	-17.17	356.73	266	-192.84	87
High	10.73	-18.51	363.20	280	-206.62	84
<b>Shoe</b>						
Combat Boot	12.85a	-16.90abc	332.45a	263a	-212.78a	87
Jungle Boot	13.78a	-15.28a	339.05a	263a	-214.00a	88
Reebok	6.24b	-21.89d	336.06a	285b	-196.54ab	87
Nike CrossTrainer	15.84a	-18.33c	390.10b	283b	-185.50b	89
Rockport	14.23a	-18.08bc	368.57b	284b	-201.92ab	94
RedWing	13.81a	-15.74ab	321.63a	284b	-197.53ab	97
<b>No Load</b>						
Combat Boot	10.52X	-17.81	351.62	260X	-209.41X	81X
Jungle Boot	11.44	-17.32	338.65	249	-226.38	82
Reebok	11.03	-15.10	342.52	240	-219.93	77
Nike CrossTrainer	2.39	-21.86	344.64	269	-207.28	76
Rockport	13.82	-18.72	393.42	261	-187.91	79
RedWing	11.73	-18.29	366.41	267	-210.62	86
	11.83	-16.04	323.30	273	-204.13	87
<b>50 lb Load</b>						
Combat Boot	15.17Y	-17.52	344.62	294Y	-193.58Y	99Y
Jungle Boot	14.25	-16.49	326.24	276	-199.19	92
Reebok	16.53	-15.45	335.57	286	-208.07	98
Nike CrossTrainer	9.66	-21.91	328.43	299	-186.99	97
Rockport	17.86	-17.94	386.78	305	-183.10	99
RedWing	16.92	-17.87	370.73	301	-193.22	101
	15.80	-15.44	319.97	396	-190.93	107

Table E-14 - (continued)

	Variables					
	A1	A2	A3	A4	A5	A6
<u>F ratios</u>						
Fitness	<1	<1	<1	<1	<1	1.39
Shoe	17.55*	23.00*	8.90*	5.13*	5.91*	2.24
Fitness X Shoe	<1	3.82*	1.30	<1	<1	<1
Load	26.50*	2.67	<1	21.88*	15.43*	39.93*
Fitness X Load	11.69*	<1	<1	7.01	3.96	10.54*
Shoe X Load	<1	<1	<1	2.27	<1	1.38
Fitness X Shoe X Load	1.25	1.00	<1	<1	<1	<1

Table E-15 - Metatarsal joint angle parameter means and *F* ratios during running for men (*N* = 15)

Conditions	Variables			
	Mt1	Mt2	Mt3	Mt4
<u>Fitness</u>				
Low	32.49	328	185.17	291
Medium	31.20	307	178.63	282
High	33.07	309	200.72	330
<u>Shoe</u>				
Combat Boot	37.01 <sup>a</sup>	313	228.59 <sup>a</sup>	308
Jungle Boot	37.44 <sup>a</sup>	318	210.68 <sup>a,c</sup>	289
Reebok	25.83 <sup>c</sup>	313	189.40 <sup>a,c</sup>	320
Nike CrossTrainer	30.07 <sup>b</sup>	318	179.86 <sup>b,c</sup>	284
Rockport	29.81 <sup>b</sup>	317	171.75 <sup>b,c</sup>	292
RedWing	32.53 <sup>b</sup>	308	148.64 <sup>b</sup>	313
<u>No Load</u>				
Combat Boot	30.42 <sup>X</sup>	281 <sup>X</sup>	164.18 <sup>X</sup>	258 <sup>X</sup>
Jungle Boot	34.73	276	200.05	274
Reebok	35.06	277	181.58	247
Nike CrossTrainer	24.16	283	173.24	285
Rockport	28.71	289	149.49	239
RedWing	28.31	283	157.15	259
	30.89	276	126.53	249
<u>50 lb Load</u>				
Combat Boot	32.50 <sup>Y</sup>	323 <sup>Y</sup>	189.13 <sup>Y</sup>	315 <sup>Y</sup>
Jungle Boot	37.39	327	228.32	318
Reebok	37.88	327	217.11	296
Nike CrossTrainer	25.84	329	178.05	334
Rockport	30.20	325	179.24	302
RedWing	29.69	327	175.71	316
	32.88	306	155.43	325

Table E-15 - (continued)

	Variables			
	Mt1	Mt2	Mt3	Mt4
70 lb Load	33.75Z	339Y	210.09Z	328Y
Combat Boot	38.98	336	257.41	333
Jungle Boot	39.17	348	230.93	321
Reebok	27.36	326	215.45	337
Nike CrossTrainer	31.31	341	210.85	310
Rockport	31.43	341	182.41	302
RedWing	33.82	341	163.94	367
<i>F</i> ratios				
Fitness	<1	<1	<1	<1
Shoe	45.32*	1.72	10.00*	1.03
Fitness X Shoe	6.48*	<1	<1	<1
Load	99.28*	54.65*	24.13*	34.82*
Fitness X Load	25.20*	32.95*	6.47*	8.61*
Shoe X Load	<1	2.33	1.41	1.94
Fitness X Shoe X Load	<1	1.35	1.20	<1

Table E-16 - Metatarsal joint angle parameter means and *F* ratios during running for women (*N* = 15)

Conditions	Variables			
	Mt1	Mt2	Mt3	Mt4
Fitness				
Low	27.06	296	135.96	237
Medium	30.14	276	164.23	232
High	27.05	284	119.39	204
Shoe				
Combat Boot	30.40 <sup>a</sup>	284	167.51	235
Jungle Boot	33.51 <sup>b</sup>	281	158.38	232
Reebok	20.28 <sup>d</sup>	280	109.36	160
Nike CrossTrainer	24.01 <sup>c</sup>	286	157.66	210
Rockport	26.24 <sup>c</sup>	286	126.26	257
RedWing	31.33 <sup>a</sup>	298	118.19	245
No Load	27.01 <sup>x</sup>	260 <sup>x</sup>	125.16	198 <sup>x</sup>
Combat Boot	29.18	267	161.58	221
Jungle Boot	31.45	252	137.62	190
Reebok	18.55	238	81.87	118
Nike CrossTrainer	23.39	260	148.41	191
Rockport	25.07	263	116.76	223
RedWing	30.40	279	102.89	232
50 lb Load	29.21 <sup>y</sup>	311 <sup>y</sup>	153.31	249 <sup>y</sup>
Combat Boot	31.61	301	173.44	249
Jungle Boot	35.56	310	179.14	273
Reebok	21.76	317	133.41	198
Nike CrossTrainer	24.47	311	164.60	226
Rockport	27.42	308	135.76	291
RedWing	32.27	317	133.48	258



Table E-16 - (continued)

	Variables			
	Mt1	Mt2	Mt3	Mt4
<u>F ratios</u>				
Fitness	1.67	1.36	1.62	<1
Shoe	21.85*	1.16	2.60	2.07
Fitness X Shoe	8.83*	<1	1.09	<1
Load	59.18*	25.44*	5.66	24.93*
Fitness X Load	101.54*	15.80*	3.53	7.14*
Shoe X Load	1.55	1.00	<1	<1
Fitness X Shoe X Load	2.05	1.42	<1	<1

Table E-17 - Rearfoot movement parameter means and *F* ratios during running for men (*N* = 15)

Conditions	Variables				
	Rf1	Rf2	Rf3	Rf4	Rf5
<u>Fitness</u>					
Low	1.67	-8.32	149	9.95	-268.70
Medium	0.28	-8.90	133	9.14	-241.82
High	3.50	-6.75	148	10.22	-229.67
<u>Shoe</u>					
Combat Boot	0.70a	-7.88	144	8.59a	-238.04
Jungle Boot	-0.14a	-9.05	142	8.84a	-272.46
Reebok	2.47b	-8.11	142	10.55b	-241.60
Nike CrossTrainer	3.89b	-6.33	150	10.14b	-238.49
Rockport	1.24c	-9.00	140	10.22b	-239.28
RedWing	2.78b	-7.55	141	10.34b	-250.51
<u>No Load</u>					
Combat Boot	2.44X	-7.39X	120X	9.82	-266.27X
Jungle Boot	1.28	-7.69	123	8.98	-284.96
Reebok	0.70	-8.69	123	8.83	-282.28
Nike CrossTrainer	3.61	-7.34	111	10.44	-254.17
Rockport	4.64	-5.68	122	10.32	-255.45
RedWing	1.99	-7.70	118	9.97	-249.58
	3.41	-6.99	123	10.38	-271.20
<u>50 lb Load</u>					
Combat Boot	1.94X Y	-8.16Y	154Y	10.10	-235.08Y
Jungle Boot	0.89	-7.88	155	8.86	-230.58
Reebok	0.14	-9.05	151	9.12	-259.01
Nike CrossTrainer	3.56	-8.44	155	10.95	-219.35
Rockport	4.17	-6.56	166	10.72	-227.15
RedWing	1.00	-9.38	148	10.37	-236.83
	2.87	-7.67	151	10.57	-237.53

Table E-17 - (continued)

	Variables				
	Rf1	Rf2	Rf3	Rf4	Rf5
70 lb Load	1.08Y	-8.41Y	156Y	9.40	-238.80Y
Combat Boot	-0.06	-8.06	155	7.92	-198.58
Jungle Boot	-0.75	-9.42	153	8.58	-276.09
Reebok	1.67	-8.60	161	10.23	-252.16
Nike CrossTrainer	2.86	-6.75	163	9.37	-232.88
Rockport	0.73	-9.65	154	10.31	-231.43
RedWing	2.05	-7.98	148	10.06	-242.80
<u>F ratios</u>					
Fitness	1.05	<1	<1	<1	<1
Shoe	5.59*	1.82	<1	3.37*	1.54
Fitness X Shoe	1.15	<1	<1	<1	<1
Load	6.89*	12.70*	9.99*	5.02	10.52*
Fitness X Load	5.99*	5.63*	7.67*	3.48	3.75
Shoe X Load	<1	1.30	1.57	<1	1.17
Fitness X Shoe X Load	<1	1.20	1.29	<1	1.08

Table E-18 - Rearfoot movement parameter means and *F* ratios during running for women (*N* = 15)

Conditions	Variables				
	Rf1	Rf2	Rf3	Rf4	Rf5
<u>Fitness</u>					
Low	2.67	-8.03	150	10.80	-314.48
Medium	2.94	-6.33	160	9.25	-253.29
High	2.11	-6.94	162	9.01	-241.02
<u>Shoe</u>					
Combat Boot	0.68a	-7.25ab	162	7.90a	-233.46a
Jungle Boot	1.73b	-7.70ab	154	9.50ab	-321.16c
Reebok	3.15c	-6.74ab	150	9.89ab	-243.86a
Nike CrossTrainer	4.62c	-6.71ab	155	11.32b	-289.04b
Rockport	1.57b	-9.39b	154	10.95b	-271.22b
RedWing	3.74c	-4.60a	170	8.27a	-249.58a
<u>No Load</u>					
Combat Boot	2.76	-6.56X	145X	9.32	-269.92
Jungle Boot	0.87	-7.19	157	8.01	-227.46
Reebok	1.22	-7.22	143	8.56	-321.42
Nike CrossTrainer	3.58	-6.18	132	9.81	-256.41
Rockport	5.20	-5.67	141	10.90	-281.44
RedWing	1.58	-8.68	143	10.26	-260.41
	4.00	-4.35	156	8.31	-268.93
<u>50 lb Load</u>					
Combat Boot	2.36	-7.61Y	170Y	9.94	-266.07
Jungle Boot	0.50	-7.31	168	7.79	-238.79
Reebok	2.19	-8.18	165	10.33	-320.91
Nike CrossTrainer	2.67	-7.38	169	9.99	-229.75
Rockport	3.94	-7.90	170	11.81	-297.73
RedWing	1.56	-10.11	165	11.64	-282.03
	3.47	-4.85	184	8.24	-230.23

Table E-18 - (continued)

	Variables				
	Rf1	Rf2	Rf3	Rf4	Rf5
<u>F ratios</u>					
Fitness	<1	<1	<1	<1	1.46
Shoe	3.57*	4.70*	1.78	7.75*	4.07*
Fitness X Shoe	<1	1.07	2.47	1.26	2.10
Load	<1	16.81*	15.50*	2.04	<1
Fitness X Load	1.24	9.89*	1.28	1.97	1.94
Shoe X Load	<1	1.48	1.23	2.06	1.41
Fitness X Shoe X Load	1.94	1.79	1.28	2.50	<1

Appendix E

Table E-19 - Medial Hamstring parameter means and *F* ratios during running for men (*N* = 15)

	Variables		
	EMG1	EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	-187.1	4.1	0.0164
Medium	-189.8	25.1	0.0212
High	-188.3	16.3	0.0208
Shoe			
Combat Boot	-201.1	10.7	0.0208
Jungle Boot	-185.1	28.4	0.0206
Reebok	-189.7	8.5	0.0176
Nike CrossTrainer	-178.1	25.3	0.0192
Rockport	-186.9	8.5	0.0183
RedWing	-189.2	9.5	0.0202
No Load	-192.8	12.7	0.0182
Combat Boot	-207.4	9.4	0.0207
Jungle Boot	-195.4	21.3	0.0203
Reebok	-196.9	3.2	0.0169
Nike CrossTrainer	-173.8	34.2	0.0167
Rockport	-189.9	2.9	0.0163
RedWing	-193.6	11.5	0.0181
50 lb Load	-178.5	28.9	0.0198
Combat Boot	-191.3	28.2	0.0222
Jungle Boot	-158.3	55.0	0.0195
Reebok	-187.8	35.5	0.0169
Nike CrossTrainer	-167.5	29.1	0.0186
Rockport	-184.2	13.8	0.0198
RedWing	-179.9	10.8	0.0216
70 lb Load	-193.5	9.1	0.0205
Combat Boot	-204.8	7.0	0.0194
Jungle Boot	-199.3	11.1	0.0219
Reebok	-184.4	8.3	0.0191
Nike CrossTrainer	-192.3	13.0	0.0222
Rockport	-186.4	8.8	0.0190
RedWing	-192.9	6.2	0.0212
<u>F ratios</u>			
Fitness	<1	1.00	1.02
Shoe	2.51	1.39	2.23
Fitness X Shoe	<1	<1	1.20
Load	1.94	2.55	<1
Fitness X Load	3.25	2.98	<1
Shoe X Load	<1	<1	1.63
Fitness X Shoe X Load	1.07	<1	1.35

Table E-20 - Medial Hamstring parameter means and *F* ratios  
during running for women (*N* = 15)

	EMG1	Variables EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	-177.4	-11.5	0.0143
Medium	-189.6	-12.9	0.0145
High	-206.6	-26.7	0.0179
Shoe			
Combat Boot	-196.6	-18.4	0.0160
Jungle Boot	-176.1	-5.1	0.0157
Reebok	-195.5	-15.9	0.0173
Nike CrossTrainer	-192.0	-30.3	0.0132
Rockport	-187.4	-22.9	0.0133
RedWing	-198.4	-8.6	0.0176
No Load	-193.7	-19.4 $\mathbf{X}$	0.0143 $\mathbf{X}$
Combat Boot	-200.4	-24.6	0.0144
Jungle Boot	-166.4	6.3	0.0151
Reebok	-200.5	-17.4	0.0166
Nike CrossTrainer	-199.8	-34.0	0.0124
Rockport	-191.7	-27.7	0.0118
RedWing	-204.0	-19.0	0.0156
50 lb Load	-188.2	-14.4 $\mathbf{Y}$	0.0167 $\mathbf{Y}$
Combat Boot	-192.4	-11.4	0.0178
Jungle Boot	-185.8	-17.9	0.0162
Reebok	-191.1	-14.6	0.0179
Nike CrossTrainer	-184.2	-26.6	0.0140
Rockport	-183.2	-18.1	0.0149
RedWing	-192.8	1.8	0.0197
<u><i>F</i> ratios</u>			
Fitness	6.36	<1	<1
Shoe	1.05	<1	1.45
Fitness X Shoe	1.64	<1	<1
Load	1.73	16.30*	10.76*
Fitness X Load	<1	1.39	5.89
Shoe X Load	<1	1.05	<1
Fitness X Shoe X Load	<1	1.86	1.39

Appendix E

Table E-21 - Rectus Femoris parameter means and *F* ratios during running for men (*N* = 15)

	Variables		
	EMG1	EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	-42.3	191.7	0.0675
Medium	-52.3	256.5	0.1185
High	-21.9	193.4	0.0462
Shoe			
Combat Boot	-38.7	210.6	0.0767
Jungle Boot	-38.1	232.9	0.0795
Reebok	-49.0	204.1	0.0759
Nike CrossTrainer	-44.1	188.2	0.0750
Rockport	-31.1	216.1	0.0786
RedWing	-32.1	235.1	0.0803
No Load	-40.8	158.1 <del>X</del>	0.0368 <del>X</del>
Combat Boot	-43.0	143.3	0.0345
Jungle Boot	-33.8	164.3	0.0317
Reebok	-38.2	164.8	0.0380
Nike CrossTrainer	-45.0	142.6	0.0331
Rockport	-42.9	165.8	0.0387
RedWing	-41.6	167.8	0.0447
50 lb Load	-47.3	215.9 <del>XY</del>	0.0720 <del>XY</del>
Combat Boot	-33.1	233.5	0.0685
Jungle Boot	-52.2	228.5	0.0805
Reebok	-75.1	199.7	0.0752
Nike CrossTrainer	-64.8	172.5	0.0718
Rockport	-28.5	216.8	0.0630
RedWing	-28.8	248.2	0.0738
70 lb Load	-28.7	269.5 <del>Y</del>	0.1247 <del>Y</del>
Combat Boot	-40.0	255.3	0.1272
Jungle Boot	-29.3	305.4	0.1265
Reebok	-33.7	247.9	0.1146
Nike CrossTrainer	-22.4	249.7	0.1200
Rockport	-21.8	265.6	0.1341
RedWing	-25.0	295.3	0.1257
<u>F ratios</u>			
Fitness	1.97	1.31	2.63
Shoe	1.33	1.42	<1
Fitness X Shoe	1.45	<1	1.29
Load	1.26	8.65*	6.18*
Fitness X Load	<1	5.67*	3.43
Shoe X Load	1.98	<1	<1
Fitness X Shoe X Load	1.66	<1	<1



Table E-22 - Rectus Femoris parameter means and *F* ratios during running for women (*N* = 15)

	EMG1	Variables EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	-29.2	175.3	0.0494
Medium	-28.3	159.4	0.0512
High	-38.0	132.6	0.0443
Shoe			
Combat Boot	-36.5	151.5	0.0489
Jungle Boot	-34.6	144.3	0.0434
Reebok	-28.1	172.8	0.0506
Nike CrossTrainer	-35.2	148.0	0.0512
Rockport	-23.1	162.4	0.0462
RedWing	-33.4	158.2	0.0501
No Load	-32.5	135.5 $\mathbf{X}$	0.0364 $\mathbf{X}$
Combat Boot	-35.8	130.1	0.0383
Jungle Boot	-43.6	110.7	0.0282
Reebok	-26.3	157.4	0.0375
Nike CrossTrainer	-37.9	135.7	0.0388
Rockport	-24.6	141.1	0.0376
RedWing	-26.3	140.6	0.0380
50 lb Load	-31.0	177.2 $\mathbf{Y}$	0.0606 $\mathbf{Y}$
Combat Boot	-37.4	175.5	0.0608
Jungle Boot	-25.6	177.9	0.0587
Reebok	-29.7	186.4	0.0623
Nike CrossTrainer	-32.1	161.9	0.0653
Rockport	-21.7	183.7	0.0548
RedWing	-40.4	175.9	0.0621
<u><i>F</i> ratios</u>			
Fitness	1.20	1.20	<1
Shoe	<1	1.97	<1
Fitness X Shoe	1.80	1.42	<1
Load	<1	30.04*	445.83*
Fitness X Load	<1	21.76*	6.61
Shoe X Load	1.02	<1	<1
Fitness X Shoe X Load	<1	<1	<1

Appendix E

Table E-23 - Anterior Tibialis parameter means and *F* ratios during running for men (*N* = 15)

	EMG1	Variables EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	-413.4	83.7	0.0514
Medium	-407.4	104.9	0.0729
High	-415.5	112.3	0.0648
Shoe			
Combat Boot	-421.1	84.1	0.0656 <sup>ab</sup>
Jungle Boot	-418.4	109.6	0.0682 <sup>a</sup>
Reebok	-410.9	88.4	0.0571 <sup>b</sup>
Nike CrossTrainer	-410.1	107.6	0.0563 <sup>b</sup>
Rockport	-399.8	106.1	0.0627 <sup>ab</sup>
RedWing	-411.8	107.8	0.0696 <sup>a</sup>
No Load	-435.3 <sup>X</sup>	79.6 <sup>X</sup>	0.0564
Combat Boot	-450.1	62.6	0.0570
Jungle Boot	-435.7	95.1	0.0604
Reebok	-429.3	84.1	0.0528
Nike CrossTrainer	-432.9	83.4	0.0519
Rockport	-419.6	83.3	0.0552
RedWing	-444.0	69.0	0.0612
50 lb Load	-405.0 <sup>XY</sup>	94.6 <sup>XY</sup>	0.0653
Combat Boot	-417.3	83.4	0.0641
Jungle Boot	-412.5	96.0	0.0719
Reebok	-427.0	66.4	0.0626
Nike CrossTrainer	-404.7	99.7	0.0628
Rockport	-378.0	100.9	0.0647
RedWing	-387.4	124.6	0.0660
70 lb Load	-395.3 <sup>Y</sup>	127.1 <sup>Y</sup>	0.0680
Combat Boot	-396.1	106.3	0.0716
Jungle Boot	-406.5	136.5	0.0766
Reebok	-376.4	114.6	0.0529
Nike CrossTrainer	-392.3	139.1	0.0548
Rockport	-400.1	133.7	0.0711
RedWing	-401.0	133.2	0.0823
<u>F ratios</u>			
Fitness	<1	<1	<1
Shoe	<1	<1	6.18*
Fitness X Shoe	<1	<1	<1
Load	6.85*	7.84*	<1
Fitness X Load	3.04	3.01	<1
Shoe X Load	1.82	<1	2.43
Fitness X Shoe X Load	1.17	<1	1.81

Table E-24 - Anterior Tibialis parameter means and *F* ratios during running for women (*N* = 15)

	EMG1	Variables EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	-452.4	53.0	0.0867
Medium	-380.6	104.4	0.0456
High	-371.6	52.2	0.0352
Shoe			
Combat Boot	-412.7	67.0	0.0617
Jungle Boot	-410.6	64.3	0.0588
Reebok	-387.8	81.4	0.0608
Nike CrossTrainer	-421.9	45.8	0.0504
Rockport	-376.4	79.8	0.0531
RedWing	-403.1	83.2	0.0529
No Load	-413.2 <sub>X</sub>	76.1	0.0476 <sub>X</sub>
Combat Boot	-419.0	60.1	0.0454
Jungle Boot	-424.2	71.7	0.0500
Reebok	-389.9	93.0	0.0521
Nike CrossTrainer	-437.8	51.0	0.0457
Rockport	-390.9	79.8	0.0444
RedWing	-414.7	103.1	0.0483
50 lb Load	-391.1 <sub>Y</sub>	64.2	0.0648 <sub>Y</sub>
Combat Boot	-405.6	74.8	0.0800
Jungle Boot	-396.9	57.0	0.0676
Reebok	-386.0	71.1	0.0686
Nike CrossTrainer	-406.1	40.6	0.0552
Rockport	-361.9	79.9	0.0618
RedWing	-391.6	63.3	0.0576
<u>F ratios</u>			
Fitness	2.68	<1	1.23
Shoe	1.64	<1	<1
Fitness X Shoe	<1	<1	<1
Load	38.74*	<1	50.12*
Fitness X Load	28.84*	1.67	1.60
Shoe X Load	<1	1.35	1.77
Fitness X Shoe X Load	<1	<1	1.38

Table E-25 - Gastrocnemius/soleus parameter means and *F* ratios during running for men (*N* = 15)

	EMG1	Variables EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	-14.1	255.4	0.0413
Medium	3.9	285.3	0.0322
High	12.7	306.5	0.0439
Shoe			
Combat Boot	-9.1	282.3	0.0388
Jungle Boot	16.1	289.5	0.0370
Reebok	-0.9	280.5	0.0382
Nike CrossTrainer	-2.2	277.7	0.0405
Rockport	5.3	284.3	0.0389
RedWing	-4.3	280.3	0.0411
No Load	-8.0	253.2 <del>X</del>	0.0373
Combat Boot	-15.5	247.6	0.0374
Jungle Boot	0.3	257.8	0.0375
Reebok	-5.1	261.0	0.0381
Nike CrossTrainer	-6.6	248.8	0.0368
Rockport	-0.9	252.6	0.0356
RedWing	-20.5	251.2	0.0387
50 lb Load	3.4	298.8 <del>Y</del>	0.0396
Combat Boot	-5.8	308.4	0.0406
Jungle Boot	34.1	310.5	0.0372
Reebok	-21.4	275.3	0.0412
Nike CrossTrainer	-1.0	298.8	0.0379
Rockport	14.4	301.1	0.0403
RedWing	-1.8	299.7	0.0404
70 lb Load	7.4	296.2 <del>Y</del>	0.0403
Combat Boot	-5.9	291.0	0.0385
Jungle Boot	15.4	302.0	0.0364
Reebok	23.8	305.2	0.0353
Nike CrossTrainer	1.1	287.3	0.0465
Rockport	2.4	299.2	0.0409
RedWing	7.4	292.5	0.0446
<u><i>F</i> ratios</u>			
Fitness	<1	4.05	<1
Shoe	2.00	<1	<1
Fitness X Shoe	<1	1.28	<1
Load	<1	14.51*	<1
Fitness X Load	<1	4.85*	<1
Shoe X Load	1.63	<1	<1
Fitness X Shoe X Load	1.79	1.41	<1

Table E-26 - Gastrocnemius/soleus parameter means and  $F$  ratios during running for women ( $N = 15$ )

	EMG1	Variables EMG2	EMG3
<u>Conditions</u>			
Fitness			
Low	43.5	288.2	0.0357
Medium	-46.3	266.6	0.0474
High	-8.8	240.6	0.0351
Shoe			
Combat Boot	1.8	272.4	0.0368
Jungle Boot	3.7	263.2	0.0397
Reebok	-3.6	276.3	0.0457
Nike CrossTrainer	-6.6	248.2	0.0339
Rockport	3.7	263.2	0.0394
RedWing	-21.3	271.3	0.0417
No Load	-6.0	247.2 $\bar{X}$	0.0379
Combat Boot	0.8	259.9	0.0356
Jungle Boot	-3.0	239.3	0.0428
Reebok	-0.3	265.5	0.0445
Nike CrossTrainer	-8.9	227.0	0.0307
Rockport	-2.7	243.7	0.0372
RedWing	-21.2	249.9	0.0374
50 lb Load	-1.6	284.0 $\bar{Y}$	0.0411
Combat Boot	3.0	286.5	0.0381
Jungle Boot	10.3	287.1	0.0366
Reebok	-6.6	285.9	0.0468
Nike CrossTrainer	-4.3	269.3	0.0372
Rockport	10.1	282.7	0.0416
RedWing	-21.4	292.7	0.0460
<u>F ratios</u>			
Fitness	3.89	1.45	2.28
Shoe	1.66	3.09	<1
Fitness X Shoe	3.49*	1.34	1.05
Load	<1	53.83*	<1
Fitness X Load	1.51	24.40*	<1
Shoe X Load	<1	1.07	<1
Fitness X Shoe X Load	<1	<1	<1

Table E-27 - Physiological parameter means and *F* ratios during running for men (*N* = 15)

	Variables		
	M1	M2	M3
<u>Conditions</u>			
Fitness			
Low	36.79	0.96	150.81
Medium	35.02	0.88	141.84
High	30.23	1.03	139.75
Shoe			
Combat Boot	34.05	0.98	147.23
Jungle Boot	32.78	1.03	142.27
Reebok	35.98	0.90	145.40
Nike CrossTrainer	33.79	0.91	140.44
Rockport	33.55	0.94	141.40
RedWing	33.77	1.00	148.10
No Load	30.24x	0.92	133.06x
Combat Boot	31.54	0.93	138.83
Jungle Boot	30.17	0.93	133.14
Reebok	29.63	0.95	133.21
Nike CrossTrainer	28.32	0.90	121.76
Rockport	29.33	0.93	133.07
RedWing	32.35	0.90	137.66
50 lb Load	34.84y	0.97	147.50y
Combat Boot	33.96	1.01	146.81
Jungle Boot	34.44	1.08	149.74
Reebok	36.22	0.90	150.18
Nike CrossTrainer	34.27	0.93	149.56
Rockport	32.67	0.94	138.67
RedWing	37.49	0.97	150.12
70 lb Load	36.48y	0.98	151.09z
Combat Boot	36.09	1.00	154.95
Jungle Boot	33.46	1.06	144.86
Reebok	41.38	0.89	151.47
Nike CrossTrainer	38.11	0.90	147.88
Rockport	37.92	0.96	151.22
RedWing	32.12	1.11	156.50
<u>F ratios</u>			
Fitness	2.71	1.78	<1
Shoe	<1	1.27	<1
Fitness X Shoe	1.50	1.53	<1
Load	13.98*	1.68	12.11*
Fitness X Load	4.82*	<1	13.38*
Shoe X Load	1.12	<1	<1
Fitness X Shoe X Load	1.03	<1	1.06

Table E-28 - Physiological parameter means and *F* ratios during running for women (*N* = 15)

	Variables		
	M1	M2	M3
<u>Conditions</u>			
Fitness			
Low	32.71	0.86	145.54
Medium	29.53	0.93	151.89
High	30.62	0.95	151.64
Shoe			
Combat Boot	31.17 <sup>a b</sup>	0.93	151.75
Jungle Boot	30.17 <sup>b</sup>	0.94	153.69
Reebok	28.94 <sup>b</sup>	0.94	146.12
Nike CrossTrainer	30.63 <sup>b</sup>	0.88	142.02
Rockport	31.12 <sup>a b</sup>	0.86	149.03
RedWing	33.77 <sup>a</sup>	0.95	154.12
No Load	27.18	0.96	143.13
Combat Boot	27.83	0.93	146.67
Jungle Boot	26.62	0.97	144.39
Reebok	25.72	0.96	137.47
Nike CrossTrainer	26.33	0.90	144.72
Rockport	27.56	0.94	142.05
RedWing	29.03	1.04	144.16
50 lb Load	34.82	0.87	156.46
Combat Boot	36.06	0.91	159.38
Jungle Boot	33.71	0.90	163.00
Reebok	32.17	0.92	154.78
Nike CrossTrainer	33.93	0.86	139.71
Rockport	34.67	0.78	157.00
RedWing	38.51	0.85	162.97
<u>F ratios</u>			
Fitness	<1	<1	<1
Shoe	6.97*	1.12	<1
Fitness X Shoe	<1	<1	<1
Load	7.00	2.37	5.33
Fitness X Load	4.37	<1	2.47
Shoe X Load	2.73	4.14*	<1
Fitness X Shoe X Load	<1	1.49	<1

**APPENDIX F**

**MEANS AND *F* RATIOS**  
**FOR**  
**PARAMETERS OF JUMP/LANDINGS FROM 0.32 M**



## KEY FOR ABBREVIATIONS OF VARIABLE NAMES

### *Vertical Ground Reaction Force Component*

- LFz1 -- first maximum force (N)
- LFz2 -- time to first maximum force (ms)
- LFz3 -- slope of first maximum force (N/s)
- LFz4 -- impact ratio (%)
- LFz5 -- second maximum force (N)
- LFz6 -- time to second maximum force (ms)

### *In-shoe Pressure*

- LP1 -- peak heel pressure (kPa)
- LP2 -- peak forefoot pressure (kPa)
- LP3 -- total movement distance of center of pressure (cm)

### *Hip Angle*

- LH1 -- maximum flexion (degrees)
- LH2 -- time to maximum flexion (ms)
- LH3 -- maximum flexion velocity (degrees/s)
- LH4 -- time to maximum flexion velocity (ms)

### *Knee Angle*

- LK1 -- maximum flexion (degrees)
- LK2 -- time to maximum flexion (ms)
- LK3 -- maximum flexion velocity (degrees/s)
- LK4 -- time to maximum flexion velocity (ms)

### *Ankle Angle*

- LA1 -- maximum dorsiflexion (degrees)
- LA2 -- time to maximum dorsiflexion (ms)
- LA3 -- maximum dorsiflexion velocity (degrees/s)
- LA4 -- time to maximum dorsiflexion velocity (ms)

### *Metatarsal Angle*

- LMt1 -- maximum flexion (degrees)
- LMt2 -- time to maximum flexion (ms)
- LMt3 -- maximum flexion velocity (degrees/s)
- LMt4 -- time to maximum flexion velocity (ms)

***Rearfoot Movement***

LRf1 -- rearfoot angle at touchdown (degrees)  
LRf2 -- maximum rearfoot angle (degrees)  
LRf3 -- time to maximum rearfoot angle (ms)  
LRf4 -- total rearfoot motion (degrees)  
LRf5 -- maximum rearfoot velocity (degrees/s)

***Electromyography***

LEMG1 -- time to onset of muscle activity (ms)  
LEMG2 -- time to end of muscle activity (ms)  
LEMG3 -- area ( $V \cdot s$ )

Table F-1 - Vertical ground reaction force component means and *F* ratios during 0.32 m jump/landings for men (*N* = 15)

Conditions	Variables				
	LFz1	LFz2	LFz3	LFz4	Fz6
Fitness					
Low	914.10	9.73	107.02	3.75	2591.7
Medium	704.52	9.59	86.74	3.80	2184.0
High	1029.70	8.06	152.93	3.72	2556.7
Shoe					
Combat Boot	968.08 <sup>ab</sup>	8.78 <sup>ab</sup>	141.89 <sup>ab</sup>	3.65	2647.2 <sup>a</sup>
Jungle Boot	948.88 <sup>ab</sup>	11.07 <sup>b</sup>	113.96 <sup>b c</sup>	4.15	2615.3 <sup>a</sup>
Reebok	741.40 <sup>b</sup>	9.92 <sup>b</sup>	86.17 <sup>c</sup>	3.63	2324.0 <sup>b</sup>
Nike CrossTrainer	747.93 <sup>b</sup>	9.17 <sup>a b</sup>	87.05 <sup>c</sup>	3.43	2270.3 <sup>b</sup>
Rockport	914.60 <sup>ab</sup>	8.99 <sup>ab</sup>	106.50 <sup>b c</sup>	3.88	2314.6 <sup>b</sup>
RedWing	1026.30 <sup>a</sup>	6.64 <sup>a</sup>	167.80 <sup>a</sup>	3.81	2493.2 <sup>ab</sup>
No Load	814.00	9.04	110.80	3.89	2363.9
Combat Boot	920.88	8.82	141.02	4.11	2447.2
Jungle Boot	834.45	11.13	103.01	4.20	2587.9
Reebok	712.00	10.11	80.79	3.97	2231.4
Nike CrossTrainer	734.78	9.36	84.89	3.74	2221.1
Rockport	758.63	8.52	99.09	3.55	2339.7
RedWing	923.27	6.32	155.99	3.78	2356.2
50 lb Load	968.55	9.23	121.15	3.68	2582.8
Combat Boot	1092.70	9.21	128.36	3.55	2893.3
Jungle Boot	1007.70	10.93	117.74	3.88	2802.0
Reebok	804.42	10.46	89.15	3.63	2531.7
Nike CrossTrainer	757.35	8.95	92.15	3.22	2294.9
Rockport	987.29	9.21	109.10	4.01	2281.1
RedWing	1147.00	6.75	187.49	3.81	2694.0
					40.52
					39.82
					40.55
					40.67
					42.43
					42.62
					37.05

Table F-1 - (continued)

	Variables					
	LFz1	LFz2	LFz3	LFz4	LFz5	Fz6
70 lb Load	902.54	9.00	121.22	3.68	2385.5	41.17
Combat Boot	887.65	8.29	157.82	3.20	2601.0	38.75
Jungle Boot	1021.50	11.16	122.94	4.39	2456.1	42.42
Reebok	713.66	9.16	89.66	3.23	2208.7	41.57
Nike CrossTrainer	753.34	9.19	84.02	3.28	2294.9	43.47
Rockport	1021.80	9.32	112.53	4.14	2323.2	42.02
RedWing	1017.30	6.88	160.31	3.84	2429.3	38.82
<u>F ratios</u>						
Fitness	1.68	1.24	2.44	<1	<1	<1
Shoe	5.00*	6.80*	15.67*	<1	8.55*	2.81
Fitness X Shoe	1.55	2.39	2.93	<1	<1	<1
Load	2.94	<1	<1	<1	1.07	<1
Fitness X Load	1.18	<1	<1	1.15	2.21	<1
Shoe X Load	1.31	1.29	<1	1.82	<1	<1
Fitness X Shoe X Load	<1	1.02	<1	1.09	<1	<1

Table F-2 - Vertical ground reaction force component means and *F* ratios during 0.32 m jump/landings for women (*N* = 15)

Conditions	Variables					
	LFz1	LFz2	LFz3	LFz4	LFz5	LFz6
Fitness						
Low	852.41	10.32	96.84	4.41	2477.1	44.47
Medium	983.41	8.81	123.02	4.11	2249.0	38.38
High	840.76	12.10	81.18	5.18	1816.7	47.31
Shoe						
Combat Boot	984.59 <sup>a</sup>	9.00 <sup>a</sup>	115.48 <sup>a</sup>	3.96 <sup>a</sup>	2270.9 <sup>a,b</sup>	39.86 <sup>a</sup>
Jungle Boot	890.35 <sup>a,b</sup>	13.18 <sup>b</sup>	78.17 <sup>b</sup>	4.84 <sup>b</sup>	2387.3 <sup>a</sup>	43.64 <sup>a</sup>
Reebok	830.43 <sup>a,b</sup>	12.17 <sup>b,c</sup>	76.57 <sup>b</sup>	5.06 <sup>b</sup>	2216.4 <sup>b,c</sup>	45.56 <sup>b</sup>
Nike CrossTrainer	758.48 <sup>b</sup>	10.82 <sup>a,c</sup>	73.15 <sup>b</sup>	4.31 <sup>a</sup>	2138.0 <sup>c</sup>	46.71 <sup>b</sup>
Rockport	875.26 <sup>a,b</sup>	9.86 <sup>a</sup>	95.05 <sup>a</sup>	4.58 <sup>a,b</sup>	2005.6 <sup>c</sup>	46.85 <sup>b</sup>
RedWing	998.89 <sup>a</sup>	6.76 <sup>d</sup>	163.49 <sup>c</sup>	4.23 <sup>a</sup>	2100.5 <sup>c</sup>	39.79 <sup>a</sup>
No Load	814.90	9.91 <sup>x</sup>	93.11	4.56	1883.2 <sup>x</sup>	44.30
Combat Boot	926.80	8.87	111.67	4.14	1989.7	41.45
Jungle Boot	830.97	12.61	72.21	4.81	2121.0	43.00
Reebok	705.83	11.39	68.62	4.88	1904.8	44.85
Nike CrossTrainer	698.00	10.50	68.95	4.41	1845.4	46.95
Rockport	796.34	9.73	86.60	4.83	1698.2	48.25
RedWing	916.88	6.78	143.42	4.36	1755.8	41.66
50 lb Load	972.58	10.58 <sup>y</sup>	110.58	4.43	2491.3 <sup>y</sup>	42.94
Combat Boot	1042.40	9.13	119.29	3.79	2552.0	38.28
Jungle Boot	942.30	13.68	83.38	4.86	2624.0	44.21
Reebok	955.03	12.96	84.51	5.25	2528.0	46.28
Nike CrossTrainer	829.03	11.20	78.04	4.20	2472.3	46.44
Rockport	954.17	9.99	103.51	4.33	2313.1	45.45
RedWing	1080.90	6.75	183.56	4.11	2445.2	37.92

Table F-2 - (continued)

	Variables					
	LFz1	LFz2	LFz3	LFz4	LFz5	LFz6
<u>F ratios</u>						
Fitness Shoe	<1	<1	<1	<1	<1	<1
Fitness X Shoe Load	9.37*	24.91*	78.10*	8.56*	41.11*	12.96*
	1.38	2.62	4.41*	<1	<1	<1
	2.18	18.53*	<1	1.14	40.07*	<1
Fitness X Load	3.20	<1	2.06	<1	1.34	<1
Shoe X Load	<1	2.48	<1	<1	1.57	1.55
Fitness X Shoe X Load	1.13	1.15	1.55	<1	<1	2.96

Table F-3 - In-shoe pressure parameter means and *F* ratios during 0.32 m jump/landings for men (*N* = 15)

	Variables		
	LP1	LP2	LP3
<u>Conditions</u>			
Fitness			
Low	314.18	250.82	17.45
Medium	221.22	209.05	18.97
High	434.20	305.70	19.72
Shoe			
Combat Boot	399.56	293.02	15.34 <sub>a</sub>
Jungle Boot	349.69	203.34	15.96 <sub>a</sub>
Reebok	232.55	228.72	19.61 <sub>b</sub>
Nike CrossTrainer	267.16	211.77	18.30 <sub>a b</sub>
Rockport	377.88	280.53	21.59 <sub>b</sub>
RedWing	307.87	249.56	18.97 <sub>a b</sub>
No Load	341.30	254.45	17.97
Combat Boot	423.82	301.20	14.42
Jungle Boot	336.18	197.68	14.20
Reebok	268.78	235.37	19.48
Nike CrossTrainer	346.74	249.47	18.85
Rockport	354.86	287.06	20.23
RedWing	317.42	239.76	17.57
50 lb Load	296.35	248.46	19.02
Combat Boot	316.04	258.81	16.48
Jungle Boot	332.25	220.20	16.25
Reebok	230.34	245.8	19.50
Nike CrossTrainer	237.54	224.10	18.04
Rockport	400.69	300.61	22.12
RedWing	261.26	241.22	19.73
70 lb Load	330.47	233.71	17.89
Combat Boot	458.81	319.05	15.11
Jungle Boot	377.94	191.01	15.08
Reebok	205.79	206.33	19.85
Nike CrossTrainer	217.20	158.64	17.13
Rockport	378.14	247.25	22.42
RedWing	344.94	267.69	17.62
<u>F ratios</u>			
Fitness	<1	1.12	<1
Shoe	1.92	1.95	4.37*
Fitness X Shoe	1.03	<1	1.45
Load	<1	<1	<1
Fitness X Load	1.00	1.20	1.36
Shoe X Load	<1	<1	<1
Fitness X Shoe X Load	<1	1.40	1.10

Table F-4 - In-shoe pressure parameter means and *F* ratios during 0.32 m jump/landings for women (*N* = 15)

	Variables		
	LP1	LP2	LP3
<u>Conditions</u>			
Fitness			
Low	651.27	689.83	19.13
Medium	717.78	330.02	19.27
High	300.08	267.96	14.14
Shoe			
Combat Boot	409.92	336.80	16.19
Jungle Boot	453.04	313.65	17.82
Reebok	305.58	299.13	17.15
Nike CrossTrainer	282.80	322.34	17.54
Rockport	367.16	348.00	16.06
RedWing	422.31	345.60	15.42
No Load	359.11x	337.30	16.99
Combat Boot	380.75	385.02	14.91
Jungle Boot	440.20	313.17	18.19
Reebok	291.96	307.83	17.96
Nike CrossTrainer	249.68	317.32	17.67
Rockport	348.74	339.45	17.42
RedWing	425.10	361.03	15.56
50 lb Load	390.30y	317.33	16.44
Combat Boot	439.10	278.94	17.47
Jungle Boot	468.45	314.13	17.44
Reebok	319.20	290.43	16.33
Nike CrossTrainer	315.93	327.37	17.41
Rockport	385.58	356.55	14.70
RedWing	418.96	330.17	15.29
<u>F ratios</u>			
Fitness	<1	<1	<1
Shoe	2.15	1.55	1.01
Fitness X Shoe	<1	1.06	<1
Load	22.59*	<1	<1
Fitness X Load	1.11	1.34	1.62
Shoe X Load	<1	<1	1.77
Fitness X Shoe X Load	<1	<1	<1



Table F-5 - Hip joint parameter means and  $F$  ratios during 0.32 m jump/landings for men ( $N = 15$ )

	Variables			
	LH1	LH2	LH3	LH4
<u>Conditions</u>				
Fitness				
Low	80.10	239	557.71 <sub>A</sub>	57
Medium	88.24	213	661.73 <sub>A</sub>	55
High	65.96	211	416.80 <sub>B</sub>	60
Shoe				
Combat Boot	77.37	222	538.60	55
Jungle Boot	81.10	233	534.34	64
Reebok	76.87	228	549.87	58
Nike CrossTrainer	79.38	227	552.68	56
Rockport	77.25	213	541.31	56
RedWing	76.78	206	556.04	54
No Load	75.69	235	547.56	58
Combat Boot	75.93	231	545.29	56
Jungle Boot	84.63	264	596.42	57
Reebok	69.48	238	512.13	66
Nike CrossTrainer	75.39	228	565.06	61
Rockport	75.61	236	523.24	60
RedWing	73.37	217	542.04	51
50 lb Load	76.78	220	543.58	58
Combat Boot	77.65	238	545.98	58
Jungle Boot	79.11	220	501.03	78
Reebok	78.44	227	575.96	55
Nike CrossTrainer	75.85	227	520.18	53
Rockport	74.33	198	541.77	54
RedWing	75.29	207	576.58	53
70 lb Load	81.85	210	545.68	55
Combat Boot	78.54	196	524.53	50
Jungle Boot	79.94	218	512.47	57
Reebok	81.88	220	557.32	55
Nike CrossTrainer	86.90	225	572.81	55
Rockport	82.18	208	558.88	55
RedWing	81.69	193	549.51	57
<u>F ratios</u>				
Fitness	<1	<1	8.88*	1.47
Shoe	<1	3.09	<1	1.37
Fitness X Shoe	<1	<1	5.55*	1.34
Load	<1	<1	<1	1.11
Fitness X Load	<1	<1	<1	1.20
Shoe X Load	1.10	1.34	1.07	1.22
Fitness X Shoe X Load	<1	<1	1.11	<1

Table F-6 - Hip joint parameter means and *F* ratios during 0.32 m jump/landings for women (*N* = 15)

	Variables			
	LH1	LH2	LH3	LH4
<u>Conditions</u>				
Fitness				
Low	72.81	192	558.51	59
Medium	50.57	138	447.95	67
High	65.05	232	585.26	65
Shoe				
Combat Boot	68.75	199	526.32	61
Jungle Boot	62.32	190	523.61	58
Reebok	59.74	182	562.53	68
Nike CrossTrainer	61.04	183	541.16	71
Rockport	58.92	180	524.21	63
RedWing	64.35	188	509.93	62
No Load	57.57x	183	516.33	65
Combat Boot	64.34	204	511.18	63
Jungle Boot	57.98	170	491.41	59
Reebok	56.31	172	545.44	69
Nike CrossTrainer	58.10	184	552.10	66
Rockport	50.61	175	496.03	66
RedWing	58.18	198	494.76	65
50 lb Load	67.28y	191	547.06	63
Combat Boot	72.66	194	541.46	59
Jungle Boot	66.66	209	559.82	57
Reebok	63.61	192	584.51	68
Nike CrossTrainer	63.98	183	530.23	77
Rockport	67.22	185	556.41	60
RedWing	69.14	180	521.74	59
<u>F ratios</u>				
Fitness	<1	2.15	1.08	<1
Shoe	2.48	<1	1.12	2.57
Fitness X Shoe	<1	1.85	1.10	1.17
Load	25.90*	2.62	<1	<1
Fitness X Load	3.10	1.19	<1	<1
Shoe X Load	<1	2.08	1.11	1.72
Fitness X Shoe X Load	2.36	1.31	1.28	1.35

Appendix F

Table F-7 - Knee joint parameter means and F ratios during 0.32 m jump/landings for men (N = 15)

	Variables			
	LK1	LK2	LK3	LK4
<u>Conditions</u>				
Fitness				
Low	80.75	202	807.12	52
Medium	91.70	187	915.69	42
High	75.22	217	584.72	52
Shoe				
Combat Boot	82.70	201	776.85	44
Jungle Boot	83.29	212	750.84	51
Reebok	81.39	205	764.90	53
Nike CrossTrainer	82.16	202	776.48	52
Rockport	81.81	200	784.39	49
RedWing	83.80	193	764.69	44
No Load	83.78	191	826.66X	44
Combat Boot	85.05	186	831.12	40
Jungle Boot	88.81	203	881.25	44
Reebok	77.94	193	769.47	45
Nike CrossTrainer	83.98	181	862.45	48
Rockport	80.72	204	781.50	47
RedWing	85.78	182	828.894	43
50 lb Load	81.62	200	734.28Y	52
Combat Boot	82.14	206	761.41	51
Jungle Boot	81.02	204	675.47	51
Reebok	82.09	207	772.56	65
Nike CrossTrainer	80.28	200	714.16	50
Rockport	81.05	194	753.92	52
RedWing	83.15	192	728.14	43
70 lb Load	82.27	215	750.84Y	49
Combat Boot	80.91	212	738.03	41
Jungle Boot	80.66	228	710.29	56
Reebok	83.76	213	753.17	49
Nike CrossTrainer	82.23	224	752.83	57
Rockport	83.75	203	821.56	47
RedWing	82.46	206	737.04	45
<u>F ratios</u>				
Fitness	<1	<1	2.63	<1
Shoe	<1	1.24	<1	1.04
Fitness X Shoe	<1	<1	2.63	1.02
Load	<1	2.48	10.40*	2.00
Fitness X Load	1.03	1.00	8.38*	2.68
Shoe X Load	<1	<1	1.69	<1
Fitness X Shoe X Load	1.05	1.27	1.14	<1

Table F-8 - Knee joint parameter means and *F* ratios during 0.32 m jump/landing for women (*N* = 15)

	Variables			
	LK1	LK2	LK3	LK4
<u>Conditions</u>				
Fitness				
Low	84.88	202	810.75	47
Medium	62.84	150	687.94	52
High	70.99	203	769.18	57
Shoe				
Combat Boot	73.24	178	751.90	50 <sub>a</sub>
Jungle Boot	71.57	189	738.53	49 <sub>a</sub>
Reebok	73.02	184	780.51	65 <sub>b</sub>
Nike CrossTrainer	72.50	185	767.54	58 <sub>a</sub>
Rockport	72.48	184	769.76	51 <sub>a</sub>
RedWing	73.25	186	726.21	41 <sub>c</sub>
No Load	71.26	167 <sub>x</sub>	758.58	53
Combat Boot	72.39	170	746.36	48
Jungle Boot	71.02	157	751.97	50
Reebok	71.91	165	787.33	60
Nike CrossTrainer	71.23	174	780.53	60
Rockport	69.03	168	761.33	53
RedWing	71.89	171	714.44	41
50 lb Load	74.04	201 <sub>y</sub>	752.79	52
Combat Boot	74.09	186	758.14	52
Jungle Boot	72.13	221	721.23	47
Reebok	74.26	207	771.74	69
Nike CrossTrainer	73.78	197	754.56	57
Rockport	75.93	201	779.40	48
RedWing	74.32	197	735.37	40
<u>F ratios</u>				
Fitness	1.11	1.99	<1	<1
Shoe	<1	<1	<1	3.91*
Fitness X Shoe	1.15	1.69	<1	1.46
Load	2.11	102.65*	<1	1.12
Fitness X Load	2.31	28.86*	1.02	<1
Shoe X Load	4.09*	1.04	<1	<1
Fitness X Shoe X Load	2.22	1.34	<1	<1

Appendix F

Table F-9 - Ankle joint parameter means and *F* ratios during  
0.32 m jump/landing for men (*N* = 15)

	Variables			
	LA1	LA2	LA3	LA4
<u>Conditions</u>				
Fitness				
Low	-25.34	218	-932.71	20
Medium	-34.34	204	-724.66	28
High	-22.91	232	-868.62	18
Shoe				
Combat Boot	-28.93	213	-796.58 <sub>a</sub>	21
Jungle Boot	-27.35	232	-825.12 <sub>a</sub>	28
Reebok	-27.98	228	-862.36 <sub>b</sub>	20
Nike CrossTrainer	-26.66	219	-896.91 <sub>b</sub>	22
Rockport	-29.01	211	-910.11 <sub>b</sub>	19
RedWing	-25.19	206	-772.78 <sub>a</sub>	21
No Load	-25.43	205	-882.29	20
Combat Boot	-25.30	175	-791.60	20
Jungle Boot	-26.80	230	-878.59	22
Reebok	-24.74	208	-926.49	20
Nike CrossTrainer	-25.63	217	-956.06	20
Rockport	-26.42	213	-955.16	19
RedWing	-23.86	192	-798.41	20
50 lb Load	-26.97	213	-807.23	20
Combat Boot	-27.03	225	-772.61	24
Jungle Boot	-26.65	214	-769.92	21
Reebok	-27.88	233	-832.48	19
Nike CrossTrainer	-26.39	210	-864.85	21
Rockport	-28.90	196	-835.66	18
RedWing	-24.97	197	-767.84	18
70 lb Load	-30.04	236	-842.07	25
Combat Boot	-34.47	240	-825.54	18
Jungle Boot	-28.55	251	-832.79	42
Reebok	-30.97	239	-835.23	20
Nike CrossTrainer	-27.96	230	-869.84	26
Rockport	-31.74	227	-948.82	21
RedWing	-26.74	228	-752.09	24
<u>F ratios</u>				
Fitness	<1	<1	2.37	2.86
Shoe	2.77	2.57	3.98*	1.12
Fitness X Shoe	<1	<1	3.98*	1.49
Load	1.92	4.22	<1	1.08
Fitness X Load	<1	1.88	<1	<1
Shoe X Load	<1	1.25	1.41	1.06
Fitness X Shoe X Load	1.38	1.55	1.68	<1

Table F-10 - Ankle joint parameters means and *F* ratios during 0.32m jump/landings for women (*N* = 15)

	Variables			
	LA1	LA2	LA3	LA4
<u>Conditions</u>				
Fitness				
Low	-30.34	221	-1080.8	26
Medium	-20.91	181	-1091.8	25
High	-20.54	235	-989.59	24
Shoe				
Combat Boot	-24.08 <sub>a</sub>	209	-986.4 <sub>a b</sub>	30
Jungle Boot	-21.77 <sub>b</sub>	212	-1000.3 <sub>a b</sub>	27
Reebok	-26.41 <sub>a</sub>	217	-1097.7 <sub>a b</sub>	24
Nike CrossTrainer	-24.52 <sub>a</sub>	219	-1168.5 <sub>b</sub>	21
Rockport	-24.97 <sub>a</sub>	200	-1154.3 <sub>a b</sub>	28
RedWing	-21.05 <sub>b</sub>	215	-912.1 <sub>a</sub>	19
No Load	-22.36	196 <sub>x</sub>	-1063.6	22
Combat Boot	-24.14	195	-999.3	22
Jungle Boot	-19.96	191	-978.8	21
Reebok	-25.39	199	-1026.4	22
Nike CrossTrainer	-23.10	211	-1176.3	21
Rockport	-23.70	182	-1272.8	29
RedWing	-18.07	199	-919.5	19
50 lb Load	-25.22	228 <sub>y</sub>	-1043.7	27
Combat Boot	-24.02	222	-973.5	37
Jungle Boot	-22.59	232	-1021.8	32
Reebok	-28.68	237	-1178.0	26
Nike CrossTrainer	-25.93	228	-1160.7	21
Rockport	-26.24	218	-1035.7	28
RedWing	-24.37	227	-906.2	19
<u>F ratios</u>				
Fitness	<1	1.79	<1	<1
Shoe	3.39*	<1	4.64*	1.40
Fitness X Shoe	<1	1.39	1.30	<1
Load	1.63	65.06*	<1	1.36
Fitness X Load	2.41	6.42	<1	1.27
Shoe X Load	1.71	<1	1.45	<1
Fitness X Shoe X Load	<1	<1	1.69	1.27

Table F-11 - Metatarsal joint parameter means and *F* ratios during 0.32 m jump/landings for men (*N* = 15)

	Variables			
	LMt1	LMt2	LMt3	LMt4
<u>Conditions</u>				
Fitness				
Low	17.18	41	304.27	57
Medium	14.14	90	199.51	41
High	20.81	55	308.96	44
Shoe				
Combat Boot	19.11	72 <sub>a</sub>	243.51 <sub>a</sub>	59
Jungle Boot	18.81	51 <sub>b</sub>	298.94 <sub>b</sub>	48
Reebok	14.53	47 <sub>b</sub>	289.54 <sub>b</sub>	38
Nike CrossTrainer	16.00	28 <sub>b</sub>	348.25 <sub>b</sub>	27
Rockport	15.91	50 <sub>b</sub>	280.78 <sub>b</sub>	47
RedWing	19.71	118 <sub>c</sub>	169.38 <sub>a</sub>	63
No Load	17.40	68	265.62	58
Combat Boot	18.23	106	228.32	92
Jungle Boot	18.31	95	281.46	76
Reebok	15.16	30	317.80	23
Nike CrossTrainer	15.43	7	318.79	23
Rockport	16.72	37	290.00	39
RedWing	20.31	136	167.64	90
50 lb Load	16.95	64	274.26	45
Combat Boot	17.70	66	246.79	52
Jungle Boot	18.69	33	287.44	22
Reebok	14.28	45	290.72	56
Nike CrossTrainer	16.01	49	388.32	31
Rockport	15.33	86	254.09	68
RedWing	19.70	106	178.20	39
70 lb Load	17.78	53	273.86	39
Combat Boot	21.39	44	255.42	32
Jungle Boot	19.38	40	325.99	50
Reebok	14.23	65	263.25	36
Nike CrossTrainer	16.58	28	337.66	27
Rockport	15.76	23	301.59	31
RedWing	19.12	113	162.32	60
<u>F ratios</u>				
Fitness	2.28	1.05	1.97	<1
Shoe	1.78	5.69*	11.19*	<1
Fitness X Shoe	1.57	1.57	1.99	<1
Load	<1	1.12	<1	1.69
Fitness X Load	<1	<1	<1	1.66
Shoe X Load	<1	1.57	1.61	1.58
Fitness X Shoe X Load	<1	<1	1.74	1.22

Table F-12 - Metatarsal joint parameter means and *F* ratios during 0.32 m jump/landings for women (N = 15)

	Variables			
	LMt1	LMt2	LMt3	LMt4
<u>Conditions</u>				
Fitness				
Low	16.38	64	259.76	38
Medium	17.16	79	299.00	55
High	18.60	75	283.17	76
Shoe				
Combat Boot	17.21 <sub>a</sub>	133 <sub>a</sub>	210.56 <sub>a</sub>	97
Jungle Boot	20.93 <sub>b</sub>	34 <sub>b</sub>	331.83 <sub>b</sub>	39
Reebok	13.82 <sub>a</sub>	59 <sub>b</sub>	306.50 <sub>b</sub>	48
Nike CrossTrainer	14.80 <sub>a</sub>	24 <sub>b</sub>	366.68 <sub>b</sub>	35
Rockport	15.51 <sub>a</sub>	92 <sub>a</sub>	234.19 <sub>a</sub>	59
RedWing	22.23 <sub>b</sub>	101 <sub>a</sub>	223.63 <sub>a</sub>	64
No Load	17.70	69	285.75	47
Combat Boot	19.21	105	219.32	69
Jungle Boot	20.97	27	318.89	31
Reebok	13.60	54	301.86	50
Nike CrossTrainer	13.93	24	375.40	33
Rockport	15.99	113	242.87	52
RedWing	23.63	106	232.13	53
50 lb Load	17.10	76	276.93	66
Combat Boot	15.23	160	202.77	123
Jungle Boot	20.89	40	344.77	47
Reebok	14.06	63	311.72	44
Nike CrossTrainer	15.67	23	357.96	37
Rockport	15.03	71	225.50	66
RedWing	21.13	98	217.03	73
<u>F ratios</u>				
Fitness	<1	<1	<1	1.72
Shoe	18.30*	4.33*	17.12*	2.79
Fitness X Shoe	1.50	1.84	2.00	1.59
Load	2.83	<1	<1	<1
Fitness X Load	<1	<1	<1	1.98
Shoe X Load	1.62	<1	<1	<1
Fitness X Shoe X Load	1.24	<1	<1	2.29



Table F-13 - Rearfoot movement parameter means and *F* ratios during 0.32 m jump/landings for men (*N* = 15)

Conditions	Variables				
	Lrf1	Lrf2	Lrf3	Lrf4	Lrf5
<u>Fitness</u>					
Low	10.54	-6.44	162	16.95	-397.9
Medium	7.11	-5.24	140	12.64	-361.2
High	5.00	-6.25	152	11.26	-341.5
<u>Shoe</u>					
Combat Boot	3.61a	-6.29	154	10.11a	-252.7a
Jungle Boot	6.13a	-7.13	166	13.50b	-352.4b
Reebok	7.87a	-5.84	151	13.79b	-400.4c
Nike CrossTrainer	12.18b	-4.52	150	16.67b	-450.0c
Rockport	7.70a	-6.27	141	13.94b	-393.9c
RedWing	7.06a	-6.00	148	13.32b	-341.7b
<u>No Load</u>					
No Load	9.32	-5.87	139X	15.18X	-424.3X
Combat Boot	4.20	-6.08	149	10.25	-295.3
Jungle Boot	6.90	-6.55	158	13.60	-393.0
Reebok	9.49	-5.95	138	15.49	-466.1
Nike CrossTrainer	15.18	-4.70	136	19.89	-520.3
Rockport	11.21	-5.60	123	16.67	-453.0
RedWing	8.02	-6.43	131	14.44	-403.0
<u>50 lb Load</u>					
50 lb Load	6.62	-6.11	157Y	12.93Y	-355.1Y
Combat Boot	3.94	-6.07	155	10.29	-246.0
Jungle Boot	6.64	-6.71	167	14.01	-371.0
Reebok	5.91	-6.72	157	12.70	-377.6
Nike CrossTrainer	9.99	-5.11	155	14.84	-431.9
Rockport	5.52	-6.95	155	12.47	-355.0
RedWing	6.64	-4.98	153	13.32	-339.0

Table F-13 - (continued)

	Variables				
	LRf1	LRf2	LRf3	LRf4	LRf5
70 lb Load	6.71	-6.01	158Y	12.80Y	-323.5Z
Combat Boot	2.69	-6.68	159	9.79	-220.3
Jungle Boot	5.12	-8.07	171	13.04	-302.0
Reebok	6.22	-4.85	157	13.16	-357.5
Nike CrossTrainer	11.38	-3.75	159	15.28	-397.9
Rockport	6.75	-6.19	144	12.98	-380.4
RedWing	5.66	-6.49	159	12.19	-282.8
<u>F ratios</u>					
Fitness	<1	<1	<1	<1	<1
Shoe	8.86*	<1	<1	5.89*	12.36*
Fitness X Shoe	1.63	<1	<1	1.73	1.07
Load	1.43	<1	8.14*	5.72*	6.75*
Fitness X Load	1.14	<1	2.29	2.06	2.36
Shoe X Load	1.16	1.36	<1	1.16	<1
Fitness X Shoe X Load	1.03	1.40	<1	1.14	1.00

Table F-14 - Rearfoot movement parameter means and *F* ratios during 0.32 m jump/landings for women (*N* = 15)

Conditions	Variables				
	LRf1	LRf2	LRf3	LRf4	LRf5
Fitness					
Low	10.77	-3.14	112	14.52	-414.92
Medium	6.23	-1.29	112	7.65	-224.55
High	7.31	-1.51	117	9.04	-242.17
Shoe					
Combat Boot	7.97	0.73a	108	7.29	-230.43
Jungle Boot	9.09	-0.78a	129	10.21	-302.78
Reebok	6.88	-3.22b	110	10.30	-280.17
Nike CrossTrainer	10.98	-0.92a	121	13.53	-347.52
Rockport	7.26	-6.18c	97	13.36	-360.94
RedWing	7.00	-1.50a	116	8.43	-260.80
No Load	8.97	-0.93	104	10.22	-314.27X
Combat Boot	8.74	0.69	97	8.05	-270.32
Jungle Boot	9.39	-0.10	126	9.51	-306.33
Reebok	8.31	-1.63	103	10.05	-305.96
Nike CrossTrainer	9.68	-1.09	99	13.75	-358.50
Rockport	8.89	-4.33	97	13.02	-369.56
RedWing	9.05	0.64	95	8.39	-300.09
50 lb Load	7.30	-3.17	124	10.79	-275.23Y
Combat Boot	6.95	0.79	123	6.28	-177.25
Jungle Boot	8.59	-1.80	134	11.49	-296.38
Reebok	4.74	-5.60	122	10.68	-241.48
Nike CrossTrainer	11.95	-0.81	135	13.37	-339.29
Rockport	5.87	-7.80	98	13.66	-353.54
RedWing	4.95	-3.36	135	8.47	-221.52

Table F-14 - (continued)

<u>F ratios</u>	Variables				
	LRf1	LRf2	LRf3	LRf4	LRf5
Fitness	2.01	<1	<1	1.02	<1
Shoe	<1	4.31*	1.92	2.13	<1
Fitness X Shoe	<1	1.74	<1	2.58	2.48
Load	2.20	3.52	2.73	2.53	49.82*
Fitness X Load	1.93	<1	<1	2.21	3.74
Shoe X Load	<1	<1	<1	<1	1.40
Fitness X Shoe X Load	1.01	1.07	1.61	1.04	1.28

Appendix F

Table F-15 - Medial Hamstring parameter means and *F* ratios  
during 0.32 m jump/landings for men (*N* = 15)

	LEMG1	Variables LEMG2	LEMG3
<u>Conditions</u>			
Fitness			
Low	-82.1	189.5	0.0059
Medium	-173.7	270.5	0.0186
High	-250.6	221.5	0.0254
Shoe			
Combat Boot	-149.7	223.6	0.0155
Jungle Boot	-168.1	239.9	0.0194
Reebok	-179.6	213.0	0.0156
Nike CrossTrainer	-167.4	224.9	0.0155
Rockport	-166.9	228.1	0.0172
RedWing	-179.5	232.9	0.0164
No Load	-181.3	258.4 <del>X</del>	0.0173
Combat Boot	-149.2	245.7	0.0144
Jungle Boot	-194.6	254.2	0.0216
Reebok	-194.7	237.3	0.0150
Nike CrossTrainer	-191.4	307.8	0.0198
Rockport	-169.6	254.8	0.0152
RedWing	-188.7	250.8	0.0177
50 lb Load	-152.9	228.1 <del>Y</del>	0.0199
Combat Boot	-152.5	233.4	0.0217
Jungle Boot	-162.3	275.9	0.0247
Reebok	-152.8	184.0	0.0169
Nike CrossTrainer	-138.7	188.5	0.0155
Rockport	-144.8	229.4	0.0200
RedWing	-165.3	253.8	0.0201
70 lb Load	-170.8	193.8 <del>Y</del>	0.0125
Combat Boot	-147.4	191.5	0.0103
Jungle Boot	-147.3	189.7	0.0118
Reebok	-193.7	218.6	0.0146
Nike CrossTrainer	-169.7	170.7	0.0108
Rockport	-186.2	200.2	0.0163
RedWing	-184.6	194.2	0.0113
<u><i>F</i> ratios</u>			
Fitness	6.91	<1	5.72
Shoe	1.16	<1	<1
Fitness X Shoe	4.03*	<1	1.57
Load	<1	6.23*	1.47
Fitness X Load	<1	2.61	1.96
Shoe X Load	<1	1.22	2.26
Fitness X Shoe X Load	<1	<1	1.33

Table F-16 - Medial Hamstring parameter means and *F* ratios  
during 0.32 m jump/landings for women (*N* = 15)

	LEMG1	Variables LEMG2	LEMG3
<u>Conditions</u>			
Fitness			
Low	-94.6	202.0	0.0092
Medium	-117.8	223.8	0.0184
High	-100.1	210.2	0.0116
Shoe			
Combat Boot	-108.6	216.8	0.0162
Jungle Boot	-109.4	199.8	0.0114
Reebok	-099.3	235.8	0.0141
Nike CrossTrainer	-094.9	194.8	0.0108
Rockport	-089.2	201.3	0.0137
RedWing	-121.5	221.6	0.0115
No Load	-100.1	189.9	0.0107 $\chi$
Combat Boot	-118.9	197.6	0.0126
Jungle Boot	-115.7	165.2	0.0097
Reebok	-86.6	232.6	0.0141
Nike CrossTrainer	-95.6	183.3	0.0101
Rockport	-70.1	175.9	0.0094
RedWing	-115.3	184.4	0.0083
30 lb Load	-107.5	233.8	0.0152 $\gamma$
Combat Boot	-97.1	238.4	0.0203
Jungle Boot	-103.2	234.3	0.0132
Reebok	-112.0	239.1	0.0140
Nike CrossTrainer	-94.3	206.3	0.0116
Rockport	-110.6	229.9	0.0185
RedWing	-127.1	254.7	0.0143
<u><i>F</i> ratios</u>			
Fitness	<1	<1	<1
Shoe	1.43	<1	1.42
Fitness X Shoe	<1	<1	1.14
Load	<1	1.60	46.72*
Fitness X Load	1.70	1.01	5.80
Shoe X Load	2.29	<1	<1
Fitness X Shoe X Load	<1	<1	1.49

Table F-17 - Rectus Femoris parameter means and *F* ratios during 0.32 m jump/landings for men (*N* = 15)

	LEMG1	Variables LEMG2	LEMG3
<u>Conditions</u>			
Fitness			
Low	-125.2	305.3	0.0301
Medium	-94.5	344.1	0.0485
High	-106.3	324.5	0.0295
Shoe			
Combat Boot	-127.7	348.0	0.0379
Jungle Boot	-103.2	331.8	0.0347
Reebok	-99.1	322.4	0.0399
Nike CrossTrainer	-103.3	338.4	0.0369
Rockport	-102.5	310.2	0.0346
RedWing	-116.1	297.2	0.0324
No Load	-111.6	3037	0.0290 <del>X</del>
Combat Boot	-124.5	328.8	0.0322
Jungle Boot	-113.4	328.2	0.0323
Reebok	-96.3	288.8	0.0288
Nike CrossTrainer	-103.2	319.8	0.0257
Rockport	-103.9	284.6	0.0267
RedWing	-128.3	272.4	0.0281
50 lb Load	-105.1	294.5	0.0346 <del>Y</del>
Combat Boot	-132.9	331.9	0.0386
Jungle Boot	-89.7	274.7	0.0310
Reebok	-105.8	307.4	0.0402
Nike CrossTrainer	-93.7	309.2	0.0374
Rockport	-112.0	293.8	0.0340
RedWing	-95.8	251.3	0.0268
70 lb Load	-109.5	376.4	0.0448 <del>Z</del>
Combat Boot	-125.7	383.3	0.0429
Jungle Boot	-106.6	392.3	0.0409
Reebok	-94.9	375.5	0.0516
Nike CrossTrainer	-113.0	388.0	0.0488
Rockport	-91.7	352.1	0.0430
RedWing	-124.2	367.9	0.0424
<u>F ratios</u>			
Fitness	<1	<1	5.42
Shoe	1.53	1.41	<1
Fitness X Shoe	<1	<1	1.39
Load	<1	2.83	15.28*
Fitness X Load	<1	1.01	4.27*
Shoe X Load	<1	<1	1.05
Fitness X Shoe X Load	1.11	<1	1.26

Table F-18 - Rectus Femoris parameter means and *F* ratios during  
0.32 m jump/landings for women (*N* = 15)

	LEMG1	Variables LEMG2	LEMG3
<u>Conditions</u>			
Fitness			
Low	-183.1	289.8	0.0331
Medium	-168.8	303.4	0.0377
High	-123.9	304.9	0.0373
Shoe			
Combat Boot	-156.1	267.8 <sub>a</sub>	0.0290
Jungle Boot	-167.0	294.3 <sub>b</sub>	0.0341
Reebok	-181.6	306.8 <sub>b</sub>	0.0366
Nike CrossTrainer	-155.8	319.2 <sub>b</sub>	0.0402
Rockport	-132.3	290.4 <sub>b</sub>	0.0385
RedWing	-156.1	315.1 <sub>b</sub>	0.0374
No Load	-167.5	243.5 <sub>X</sub>	0.0233 <sub>X</sub>
Combat Boot	-182.2	213.6	0.0223
Jungle Boot	-180.6	242.0	0.0242
Reebok	-201.9	264.2	0.0258
Nike CrossTrainer	-151.3	267.3	0.0240
Rockport	-140.4	232.7	0.0201
RedWing	-148.7	241.0	0.0234
50 lb Load	-148.9	357.3 <sub>Y</sub>	0.0491 <sub>Y</sub>
Combat Boot	-126.6	317.5	0.0365
Jungle Boot	-153.4	346.6	0.0439
Reebok	-161.2	349.4	0.0473
Nike CrossTrainer	-160.3	371.1	0.0563
Rockport	-123.1	355.4	0.0591
RedWing	-163.6	399.2	0.0513
<u><i>F</i> ratios</u>			
Fitness	<1	<1	<1
Shoe	1.54	5.49*	1.82
Fitness X Shoe	<1	<1	<1
Load	<1	39.71*	18.86*
Fitness X Load	1.30	5.59	4.76
Shoe X Load	1.99	<1	1.73
Fitness X Shoe X Load	2.19	<1	1.18



Table F-19 - Anterior Tibialis parameter means and *F* ratios during 0.32 m jump/landings for men (*N* = 15)

	Variables		
	LEMG1	LEMG2	LEMG3
<u>Conditions</u>			
Fitness			
Low	-96.1	249.6	0.0326
Medium	-129.8	274.0	0.0444
High	-215.5	195.8	0.0317
Shoe			
Combat Boot	-137.2	257.9	0.0405
Jungle Boot	-156.5	248.7	0.0362
Reebok	-159.1	224.5	0.0359
Nike CrossTrainer	-146.3	268.0	0.0415
Rockport	-131.1	228.6	0.0335
RedWing	-149.3	213.6	0.0300
No Load	-164.8	218.2 <del>X</del>	0.0310
Combat Boot	-132.8	232.7	0.0350
Jungle Boot	-180.6	209.0	0.0293
Reebok	-165.2	248.7	0.0387
Nike CrossTrainer	-171.6	256.4	0.0354
Rockport	-153.1	201.3	0.0246
RedWing	-185.7	161.1	0.0231
50 lb Load	-137.2	233.3 <del>X</del>	0.0307
Combat Boot	-129.6	247.3	0.0310
Jungle Boot	-156.9	261.3	0.0344
Reebok	-156.3	185.6	0.0266
Nike CrossTrainer	-123.5	263.7	0.0408
Rockport	-114.6	239.3	0.0288
RedWing	-141.3	204.9	0.0236
70 lb Load	-137.2	269.4 <del>Y</del>	0.0471
Combat Boot	-149.3	293.8	0.0554
Jungle Boot	-132.0	275.8	0.0448
Reebok	-155.7	240.7	0.0430
Nike CrossTrainer	-141.5	285.0	0.0488
Rockport	-125.7	245.2	0.0470
RedWing	-121.1	274.9	0.0433
<u><i>F</i> ratios</u>			
Fitness	1.53	2.56	<1
Shoe	1.21	1.89	<1
Fitness X Shoe	1.14	1.85	<1
Load	2.53	12.96*	2.85
Fitness X Load	<1	1.41	2.38
Shoe X Load	1.85	1.55	<1
Fitness X Shoe X Load	1.36	1.09	<1

Table F-20 - Anterior Tibialis parameter means and  $F$  ratios during  
0.32 m jump/landings for women ( $N = 15$ )

	LEMG1	Variables LEMG2	LEMG3
<u>Conditions</u>			
Fitness			
Low	-193.9	233.3	0.0348
Medium	-193.0	209.4	0.0346
High	-102.0	280.8	0.0340
Shoe			
Combat Boot	-156.9	200.8	0.0400
Jungle Boot	-170.0	246.4	0.0311
Reebok	-161.0	267.6	0.0337
Nike CrossTrainer	-147.2	262.0	0.0371
Rockport	-161.9	229.4	0.0298
RedWing	-177.3	241.6	0.0351
No Load	-152.8	199.8	0.0237X
Combat Boot	-162.6	169.3	0.0298
Jungle Boot	-164.3	181.9	0.0207
Reebok	-127.0	241.9	0.0240
Nike CrossTrainer	-142.7	225.3	0.0251
Rockport	-150.0	178.6	0.0191
RedWing	-170.3	201.6	0.0234
50 lb Load	-172.4	285.3	0.0456Y
Combat Boot	-150.5	235.6	0.0515
Jungle Boot	-175.7	311.0	0.0414
Reebok	-195.0	293.2	0.0433
Nike CrossTrainer	-151.7	298.7	0.0490
Rockport	-175.3	286.5	0.0419
RedWing	-184.2	281.6	0.0468
<u>F ratios</u>			
Fitness	1.24	1.54	<1
Shoe	1.37	1.31	<1
Fitness X Shoe	<1	1.13	<1
Load	1.51	7.24	20.71*
Fitness X Load	1.27	2.07	3.16
Shoe X Load	4.91*	1.46	<1
Fitness X Shoe X Load	1.05	<1	<1

Appendix F

Table F-21 - Gastrocnemius/soleus parameter means and *F* ratios during 0.32 m jump/landings for men (*N* = 15)

	Variables		
	LEMG1	LEMG2	LEMG3
<u>Conditions</u>			
Fitness			
Low	-273.8	88.4	0.0555
Medium	-238.3	180.1	0.0334
High	-208.8	150.7	0.0282
Shoe			
Combat Boot	-241.0	139.2	0.0429
Jungle Boot	-235.9	124.3	0.0370
Reebok	-236.5	141.4	0.0390
Nike CrossTrainer	-234.4	181.1	0.0401
Rockport	-240.5	123.7	0.0382
RedWing	-256.8	128.9	0.0386
No Load	-247.2	135.5	0.0343
Combat Boot	-232.4	134.7	0.0368
Jungle Boot	-253.9	104.6	0.0340
Reebok	-250.4	123.5	0.0311
Nike CrossTrainer	-235.2	211.0	0.0348
Rockport	-256.3	116.8	0.0333
RedWing	-254.9	122.3	0.0356
50 lb Load	-237.5	148.6	0.0429
Combat Boot	-259.0	120.1	0.0498
Jungle Boot	-246.3	147.6	0.0423
Reebok	-223.7	174.8	0.0437
Nike CrossTrainer	-230.6	184.0	0.0475
Rockport	-207.9	127.0	0.0406
RedWing	-258.6	138.9	0.0342
70 lb Load	-237.9	134.0	0.0408
Combat Boot	-232.3	163.4	0.0425
Jungle Boot	-207.3	120.6	0.0347
Reebok	-235.5	124.5	0.0426
Nike CrossTrainer	-237.2	145.5	0.0385
Rockport	-257.3	127.3	0.0406
RedWing	-256.8	125.6	0.0462
<u>F ratios</u>			
Fitness	1.20	1.69	3.94
Shoe	<1	1.22	<1
Fitness X Shoe	<1	1.23	1.58
Load	<1	<1	<1
Fitness X Load	1.91	<1	1.70
Shoe X Load	1.26	<1	1.21
Fitness X Shoe X Load	<1	1.03	<1

Table F-22 - Gastrocnemius/soleus parameter means and *F* ratios  
during 0.32 m jump/landings for women (*N* = 15)

	LEMG1	Variables LEMG2	LEMG3
<u>Conditions</u>			
Fitness			
Low	-271.8	126.6	0.0372
Medium	-215.1	129.2	0.0386
High	-228.9	117.6	0.0227
Shoe			
Combat Boot	-257.4	110.8	0.0319
Jungle Boot	-237.6	109.4	0.0306
Reebok	-245.3	150.3	0.0357
Nike CrossTrainer	-217.9	111.5	0.0303
Rockport	-240.2	112.8	0.0339
RedWing	-239.9	149.4	0.0352
No Load	-255.4 $\bar{X}$	99.0 $\bar{X}$	0.0293
Combat Boot	-270.4	90.8	0.0312
Jungle Boot	-243.8	87.2	0.0258
Reebok	-279.6	102.4	0.0291
Nike CrossTrainer	-231.0	98.2	0.0289
Rockport	-244.9	89.9	0.0288
RedWing	-264.6	124.8	0.0323
50 lb Load	-222.4 $\bar{Y}$	151.0 $\bar{Y}$	0.0367
Combat Boot	-242.6	133.7	0.0327
Jungle Boot	-231.3	131.7	0.0353
Reebok	-211.0	198.1	0.0422
Nike CrossTrainer	-204.9	124.8	0.0317
Rockport	-234.9	138.5	0.0396
RedWing	-215.3	170.4	0.0380
<u>F ratios</u>			
Fitness	< 1	< 1	1.30
Shoe	< 1	1.10	1.43
Fitness X Shoe	< 1	< 1	1.07
Load	17.62*	21.91*	2.42
Fitness X Load	1.62	6.20	< 1
Shoe X Load	2.70	1.00	2.27
Fitness X Shoe X Load	1.16	1.06	1.32

## **APPENDIX G**

### **MEANS AND *F* RATIOS FOR PARAMETERS OF JUMP/LANDINGS FROM 0.72 M**

## KEY FOR ABBREVIATIONS OF VARIABLE NAMES

### *Vertical Ground Reaction Force Component*

LFz1 -- first maximum force (N)  
LFz2 -- time to first maximum force (ms)  
LFz3 -- slope of first maximum force (N/s)  
LFz4 -- impact ratio (%)  
LFz5 -- second maximum force (N)  
LFz6 -- time to second maximum force (ms)

### *In-shoe Pressure*

LP1 -- peak heel pressure (kPa)  
LP2 -- peak forefoot pressure (kPa)  
LP3 -- total movement distance of center of pressure (cm)

### *Hip Angle*

LH1 -- maximum flexion (degrees)  
LH2 -- time to maximum flexion (ms)  
LH3 -- maximum flexion velocity (degrees/s)  
LH4 -- time to maximum flexion velocity (ms)

### *Knee Angle*

LK1 -- maximum flexion (degrees)  
LK2 -- time to maximum flexion (ms)  
LK3 -- maximum flexion velocity (degrees/s)  
LK4 -- time to maximum flexion velocity (ms)

### *Ankle Angle*

LA1 -- maximum dorsiflexion (degrees)  
LA2 -- time to maximum dorsiflexion (ms)  
LA3 -- maximum dorsiflexion velocity (degrees/s)  
LA4 -- time to maximum dorsiflexion velocity (ms)

### *Metatarsal Angle*

LMt1 -- maximum flexion (degrees)  
LMt2 -- time to maximum flexion (ms)  
LMt3 -- maximum flexion velocity (degrees/s)  
LMt4 -- time to maximum flexion velocity (ms)

***Rearfoot Movement***

LRf1 -- rearfoot angle at touchdown (degrees)

LRf2 -- maximum rearfoot angle (degrees)

LRf3 -- time to maximum rearfoot angle (ms)

LRf4 -- total rearfoot motion (degrees)

LRf5 -- maximum rearfoot velocity (degrees/s)

***Electromyography***

LEMG1 -- time to onset of muscle activity (ms)

LEMG2 -- time to end of muscle activity (ms)

LEMG3 -- area ( $V \cdot s$ )

Table G-1 - Vertical ground reaction force component means and *F* ratios during 0.72 m jump/landings for men (*N* = 15)

Conditions	Variables					
	LFz1	LFz2	LFz3	LFz4	LFz5	LFz6
<b>Fitness</b>						
Low	1696.4	9.70	184.53	4.79	3633.7	37.89
Medium	1249.5	10.80	130.33	5.35	2998.2	40.05
High	1650.9	9.41	201.50	4.54	3977.1	36.86
<b>Shoe</b>						
Combat Boot	1779.9a	10.05a	191.33ab	4.95	3849.9	37.12ab
Jungle Boot	1619.3a	11.72b	152.45ac	5.09	3899.2	38.66b
Reebok	1391.9b	11.01ab	135.01c	5.15	3262.6	39.88b
Nike CrossTrainer	1390.2b	10.44a	141.25c	4.87	3209.3	39.76b
Rockport	1428.2b	9.77a	158.14ac	4.78	3228.3	39.89b
RedWing	1624.3a	6.87c	267.92b	4.41	3768.7	34.30a
<b>No Load</b>	1401.1X	9.41	174.74	4.91	3136.3X	37.90
Combat Boot	1618.4	9.32	197.09	5.07	3379.2	36.55
Jungle Boot	1480.9	11.04	157.61	5.12	3322.9	38.78
Reebok	1310.4	10.46	137.12	5.11	2921.3	39.13
Nike CrossTrainer	1288.3	9.79	146.23	4.83	2997.7	38.12
Rockport	1320.1	9.23	159.71	4.79	2907.7	39.55
RedWing	1388.5	6.60	250.64	4.52	3289.0	35.28
<b>50 lb Load</b>	1652.6Y	9.96	186.81	4.89	3632.6Y	38.28
Combat Boot	1910.5	10.09	205.73	4.89	3961.4	37.47
Jungle Boot	1746.3	12.14	153.84	5.25	4024.4	38.90
Reebok	1530.5	10.94	145.15	5.14	3454.8	39.90
Nike CrossTrainer	1425.3	10.32	144.24	4.84	3202.8	40.42
Rockport	1478.7	9.56	165.62	4.79	3270.2	39.32
RedWing	1824.3	6.79	306.84	4.40	3882.2	33.65



Table G-1 - (continued)

	Variables					
	LFz1	LFz2	LFz3	LFz4	LFz5	LFz6
70 lb Load	1564.7X	10.47	162.40	4.83	3840.0Y	38.63
Combat Boot	1794.7	10.70	174.60	4.89	4209.0	37.33
Jungle Boot	1649.2	11.92	149.88	4.92	4350.4	38.30
Reebok	1369.3	11.53	122.75	5.16	3411.6	40.62
Nike CrossTrainer	1442.9	11.12	134.36	4.91	3427.4	40.73
Rockport	1472.1	10.40	149.97	4.74	3506.9	40.80
RedWing	1660.0	7.17	246.63	4.33	4134.8	33.97
<i>F</i> ratios						
Fitness	<1	<1	1.54	<1	<1	<1
Shoe	6.14*	22.19*	22.37*	<1	3.47	8.91*
Fitness X Shoe	1.35	3.25*	3.14*	1.01	1.90	<1
Load	39.56*	<1	<1	<1	9.52*	<1
Fitness X Load	1.68	1.03	<1	<1	2.48	<1
Shoe X Load	<1	<1	1.34	<1	<1	1.53
Fitness X Shoe X Load	<1	1.19	<1	<1	1.13	1.66

Table G-2 - Vertical ground reaction force component means and *F* ratios during 0.72 m jump/landings for women (N = 15)

Conditions	Variables					
	LFz1	LFz2	LFz3	LFz4	LFz5	LFz6
<u>Fitness</u>						
Low	1470.5	10.19	156.64	5.54	3520.9	37.83
Medium	1804.4	9.39	205.78	5.61	3146.7	35.51
High	1374.2	10.81	141.20	5.95	2527.0	41.01
<u>Shoe</u>						
Combat Boot	1700.5 <sup>a</sup>	9.51 <sup>a</sup>	182.13 <sup>a</sup>	5.33 <sup>a</sup>	3132.0 <sup>a</sup>	36.64 <sup>a</sup>
Jungle Boot	1596.0 <sup>a b</sup>	13.01 <sup>b</sup>	127.79 <sup>b</sup>	6.18 <sup>b</sup>	3292.6 <sup>a</sup>	39.87 <sup>b</sup>
Reebok	1463.2 <sup>b</sup>	11.34 <sup>b c</sup>	137.33 <sup>b</sup>	6.28 <sup>b</sup>	2952.9 <sup>b</sup>	40.49 <sup>b</sup>
Nike CrossTrainer	1334.4 <sup>b</sup>	10.43 <sup>a c</sup>	131.61 <sup>b</sup>	5.65 <sup>c</sup>	2786.2 <sup>b</sup>	39.93 <sup>b</sup>
Rockport	1519.9 <sup>a b</sup>	9.39 <sup>a</sup>	170.78 <sup>a</sup>	5.57 <sup>c</sup>	2855.3 <sup>b</sup>	39.56 <sup>b</sup>
RedWing	1679.0 <sup>a</sup>	6.97 <sup>d</sup>	255.38 <sup>c</sup>	5.09 <sup>d</sup>	3275.9 <sup>a</sup>	33.69 <sup>c</sup>
<u>No Load</u>						
Combat Boot	1529.7	9.58 <sup>x</sup>	177.44	5.72	3011.9 <sup>x</sup>	36.99
Jungle Boot	1667.4	9.00	189.89	5.40	2968.9	35.68
Reebok	1574.3	12.35	133.17	6.21	3236.2	38.30
Nike CrossTrainer	1416.6	10.73	144.80	6.26	2962.5	39.00
Rockport	1292.9	9.84	137.64	5.61	2804.8	38.68
RedWing	1545.3	9.04	182.15	5.77	2835.4	38.53
	1639.7	6.63	268.55	5.13	3215.5	32.66
<u>50 lb Load</u>						
Combat Boot	1582.6	10.60 <sup>y</sup>	160.36	5.62	3108.1 <sup>y</sup>	39.54
Jungle Boot	1733.5	10.03	174.38	5.25	3295.2	37.92
Reebok	1617.7	13.68	122.41	6.15	3349.0	41.43
Nike CrossTrainer	1509.7	11.96	129.58	6.29	2943.4	41.98
Rockport	1375.9	11.01	125.58	5.69	2767.6	41.18
RedWing	1494.5	9.73	159.41	5.36	2875.2	40.60
	1718.3	7.30	242.21	5.03	3336.4	34.72

Table G-2 - (continued)

	Variables					
	LFz1	LFz2	LFz3	LFz4	LFz5	LFz6
<u>F ratios</u>						
Fitness	<1	<1	<1	<1	<1	<1
Shoe	7.93*	49.41*	87.90*	6.56*	11.41*	12.96*
Fitness X Shoe	1.70	4.61*	5.80*	<1	1.13	1.16
Load	6.38	13.85*	1.63	4.88	80.07*	<1
Fitness X Load	1.07	5.02	<1	<1	<1	1.42
Shoe X Load	1.87	2.48	1.42	1.08	3.57	1.55
Fitness X Shoe X Load	<1	2.25	<1	1.38	2.10	1.80

Table G-3 - In-shoe pressure parameter means and *F* ratios during 0.72 m jump/landings for men (*N* = 15)

	Variables		
	LP1	LP2	LP3
<u>Conditions</u>			
Fitness			
Low	313.87	256.00	22.62
Medium	439.29	246.76	20.15
High	561.17	375.59	25.32
Shoe			
Combat Boot	433.92	323.88	21.33
Jungle Boot	480.26	280.89	22.04
Reebok	359.25	331.01	25.23
Nike CrossTrainer	391.08	310.62	23.76
Rockport	488.10	317.56	24.22
RedWing	475.93	322.76	22.95
No Load	364.88	269.06	22.73
Combat Boot	310.82	213.18	21.15
Jungle Boot	330.26	209.25	20.20
Reebok	332.77	362.14	24.96
Nike CrossTrainer	415.40	332.99	22.63
Rockport	417.27	242.51	24.26
RedWing	382.78	255.90	23.16
50 lb Load	423.41	320.21	23.30
Combat Boot	408.43	318.67	22.75
Jungle Boot	486.56	273.47	22.69
Reebok	292.42	281.26	24.97
Nike CrossTrainer	311.42	274.30	24.18
Rockport	514.05	391.12	23.08
RedWing	527.56	415.71	21.67
70 lb Load	525.98	353.03	23.70
Combat Boot	582.52	417.65	20.39
Jungle Boot	623.97	359.95	23.25
Reebok	452.55	354.29	25.88
Nike CrossTrainer	446.43	333.64	24.36
Rockport	532.99	333.75	25.10
RedWing	517.44	315.27	23.77
<u>F ratios</u>			
Fitness	<1	<1	1.14
Shoe	2.52	<1	1.16
Fitness X Shoe	1.26	1.02	<1
Load	<1	<1	<1
Fitness X Load	1.05	1.16	1.41
Shoe X Load	2.35	1.18	<1
Fitness X Shoe X Load	1.00	1.22	1.30

Table G-4 - In-shoe pressure parameter means and *F* ratios during 0.72 m jump/landings for women (*N* = 15)

	Variables		
	LP1	LP2	LP3
<u>Conditions</u>			
Fitness			
Low	604.89	453.03	23.75
Medium	482.63	435.47	18.09
High	364.26	384.34	18.05
Shoe			
Combat Boot	510.09	442.51	19.67
Jungle Boot	536.70	379.44	20.89
Reebok	340.30	347.99	21.00
Nike CrossTrainer	313.74	349.02	20.11
Rockport	399.66	372.69	21.04
RedWing	638.32	433.01	18.78
No Load	468.29	370.75	20.67
Combat Boot	526.51	415.35	20.94
Jungle Boot	582.21	380.17	21.42
Reebok	339.04	327.04	21.12
Nike CrossTrainer	340.23	333.22	20.75
Rockport	380.98	367.00	21.53
RedWing	650.46	409.14	17.99
50 lb Load	441.57	401.27	19.93
Combat Boot	496.40	465.14	18.61
Jungle Boot	491.18	378.71	20.35
Reebok	341.55	368.94	20.87
Nike CrossTrainer	281.95	364.82	19.46
Rockport	418.34	378.38	20.54
RedWing	623.74	461.67	19.73
<u>F ratios</u>			
Fitness	<1	1.03	<1
Shoe	1.47	1.72	1.41
Fitness X Shoe	<1	1.23	1.61
Load	2.71	<1	<1
Fitness X Load	<1	1.02	1.55
Shoe X Load	<1	2.26	<1
Fitness X Shoe X Load	<1	<1	<1

Table G-5 - Hip joint parameter means and *F* ratios during 0.72 m jump/landings for men (*N* = 15)

	Variables			
	LH1	LH2	LH3	LH4
<u>Conditions</u>				
Fitness				
Low	107.22	297	745.9 <sup>A</sup>	53
Medium	104.01	246	809.7 <sup>A</sup>	53
High	82.59	263	607.9 <sup>B</sup>	60
Shoe				
Combat Boot	97.55	262	713.8	55
Jungle Boot	100.03	270	758.8	60
Reebok	97.01	268	702.9	56
Nike CrossTrainer	98.06	268	741.5	53
Rockport	99.53	286	704.1	55
RedWing	97.11	261	720.1	52
No Load	98.08	263	733.06	54
Combat Boot	96.38	256	730.38	60
Jungle Boot	104.28	269	772.88	51
Reebok	97.78	276	728.44	55
Nike CrossTrainer	95.17	241	756.66	50
Rockport	101.79	288	674.00	58
RedWing	93.87	254	713.28	53
50 lb Load	97.29	272	716.12	58
Combat Boot	95.98	259	668.63	52
Jungle Boot	99.24	270	709.37	77
Reebok	95.77	268	701.95	60
Nike CrossTrainer	96.88	287	746.17	55
Rockport	97.86	283	732.23	54
RedWing	97.99	265	733.59	49
70 lb Load	99.26	272	723.58	53
Combat Boot	100.44	271	744.27	52
Jungle Boot	96.47	270	787.82	50
Reebok	97.63	261	681.35	54
Nike CrossTrainer	102.48	280	722.37	54
Rockport	99.42	288	693.53	54
RedWing	99.46	263	713.54	54
<u><i>F</i> ratios</u>				
Fitness	<1	<1	27.94*	2.87
Shoe	<1	<1	2.38	2.76
Fitness X Shoe	<1	<1	1.24	1.36
Load	<1	<1	1.58	2.95
Fitness X Load	<1	<1	1.77	<1
Shoe X Load	<1	1.11	<1	<1
Fitness X Shoe X Load	1.25	1.04	1.40	1.04

Table G-6 - Hip joint parameter means and *F* ratios during 0.72 m jump/landings for women (*N* = 15)

	Variables			
	LH1	LH2	LH3	LH4
<u>Conditions</u>				
Fitness				
Low	104.42	287	807.07	61
Medium	81.20	196	753.57	70
High	96.82	264	851.36	59
Shoe				
Combat Boot	98.64	258	825.14	64
Jungle Boot	92.96	246	789.33	58
Reebok	90.84	244	806.28	60
Nike CrossTrainer	92.10	242	778.53	64
Rockport	93.00	249	773.70	75
RedWing	98.82	259	860.40	58
No Load	95.50	260	798.85	65
Combat Boot	102.18	275	823.17	69
Jungle Boot	91.49	248	780.79	56
Reebok	92.34	258	787.95	61
Nike CrossTrainer	92.57	255	799.08	59
Rockport	93.04	258	761.13	89
RedWing	102.08	270	849.27	53
50 lb Load	93.15	238	809.84	62
Combat Boot	95.11	242	827.12	59
Jungle Boot	94.60	243	800.32	60
Reebok	89.33	231	824.62	60
Nike CrossTrainer	91.58	227	755.41	68
Rockport	92.96	239	786.28	61
RedWing	95.55	248	873.13	64
<u>F ratios</u>				
Fitness	1.36	2.83	5.59	2.20
Shoe	3.02	2.19	1.57	2.16
Fitness X Shoe	1.04	2.01	1.08	1.05
Load	<1	3.12	6.45	<1
Fitness X Load	<1	1.44	<1	<1
Shoe X Load	4.04*	<1	<1	1.67
Fitness X Shoe X Load	4.08*	1.02	<1	1.23

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Table G-7 - Knee joint parameter means and *F* ratios during 0.72 m jump/landings for men (*N* = 15)

	Variables			
	LK1	LK2	LK3	LK4
<u>Conditions</u>				
Fitness				
Low	90.92	222	922.5	47
Medium	100.33	200	992.8	41
High	84.89	239	721.5	52
Shoe				
Combat Boot	93.05	211	881.8	45
Jungle Boot	91.43	217	874.9	48
Reebok	90.94	223	862.9	47
Nike CrossTrainer	92.80	223	914.0	47
Rockport	91.08	231	853.4	47
RedWing	93.41	216	898.4	44
No Load	95.36 <del>X</del>	209 <del>X</del>	938.27	45
Combat Boot	97.15	203	939.38	40
Jungle Boot	98.67	207	976.62	43
Reebok	91.73	223	901.96	55
Nike CrossTrainer	93.93	195	988.00	44
Rockport	93.40	241	843.35	47
RedWing	96.42	192	955.20	44
50 lb Load	91.95 <del>X</del> <del>Y</del>	220 <del>Y</del>	834.05	48
Combat Boot	92.56	203	816.12	48
Jungle Boot	89.62	218	823.23	46
Reebok	91.44	219	820.34	46
Nike CrossTrainer	92.83	237	832.98	55
Rockport	90.56	218	847.72	47
RedWing	94.57	222	860.61	45
70 lb Load	89.04 <del>Y</del>	232 <del>Z</del>	871.27	46
Combat Boot	88.91	227	882.69	49
Jungle Boot	85.79	226	819.04	55
Reebok	89.59	226	871.55	42
Nike CrossTrainer	91.49	241	911.79	44
Rockport	89.63	236	868.54	45
RedWing	89.22	234	879.52	41
<u><i>F</i> ratios</u>				
Fitness	<1	<1	2.57	1.21
Shoe	<1	<1	1.69	<1
Fitness X Shoe	<1	<1	1.39	1.17
Load	9.60*	6.08*	2.71	<1
Fitness X Load	1.62	1.63	1.29	<1
Shoe X Load	1.99	1.72	1.48	1.22
Fitness X Shoe X Load	1.55	<1	1.74	<1



Table G-8 - Knee joint parameter means and *F* ratios during 0.72 m jump/landings for women (*N* = 15)

	Variables			
	LK1	LK2	LK3	LK4
<u>Conditions</u>				
Fitness				
Low	104.18	227	1047.9	46
Medium	80.80	171	938.20	41
High	91.39	221	1032.5	56
Shoe				
Combat Boot	91.93	204	1009.5	49
Jungle Boot	90.82	202	976.8	44
Reebok	93.03	205	1025.6	49
Nike CrossTrainer	92.12	213	1028.0	49
Rockport	91.57	206	1014.4	49
RedWing	94.84	210	984.8	45
No Load	94.99 <sub>x</sub>	198 <sub>x</sub>	1051.2 <sub>x</sub>	44
Combat Boot	94.98	199	1050.1	41
Jungle Boot	93.17	194	1020.1	43
Reebok	96.35	197	1068.9	46
Nike CrossTrainer	93.53	197	1057.8	47
Rockport	92.86	198	1067.8	45
RedWing	99.52	202	1041.5	43
50 lb Load	89.62 <sub>y</sub>	216 <sub>y</sub>	961.1 <sub>y</sub>	51
Combat Boot	88.87	210	968.9	58
Jungle Boot	88.19	212	928.1	45
Reebok	89.72	212	982.3	51
Nike CrossTrainer	90.53	230	994.5	51
Rockport	90.28	214	961.0	53
RedWing	90.16	218	928.1	48
<u>F ratios</u>				
Fitness	2.70	1.64	<1	1.53
Shoe	1.00	<1	1.20	1.24
Fitness X Shoe	1.19	1.33	<1	<1
Load	316.88*	11.85*	10.51*	7.51
Fitness X Load	7.46*	6.64	5.72	1.39
Shoe X Load	1.56	<1	<1	<1
Fitness X Shoe X Load	1.67	1.13	<1	<1

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Table G-9 - Ankle joint parameter means and *F* ratios during  
0.72 m jump/landings for men (*N* = 15)

	Variables			
	LA1	LA2	LA3	LA4
<u>Conditions</u>				
Fitness				
Low	-26.95	219	-1211.3	17
Medium	-34.78	204	-943.0	25
High	-24.08	237	-1205.7	17
Shoe				
Combat Boot	-29.33 <sub>a</sub>	200	-1033.5 <sub>a</sub>	19
Jungle Boot	-28.66 <sub>a</sub>	223	-1105.7 <sub>a</sub>	24
Reebok	-29.39 <sub>a</sub>	228	-1160.8 <sub>ab</sub>	22
Nike CrossTrainer	-28.70 <sub>a</sub>	230	-1191.7 <sub>b</sub>	19
Rockport	-29.47 <sub>a</sub>	222	-1204.5 <sub>b</sub>	19
RedWing	-26.57 <sub>b</sub>	217	-1031.7 <sub>a</sub>	17
No Load	-28.75	209	-1106.0	19
Combat Boot	-29.86	202	-1015.5	17
Jungle Boot	-30.28	226	-1099.0	18
Reebok	-28.17	214	-1170.2	28
Nike CrossTrainer	-29.57	199	-1073.4	20
Rockport	-27.22	235	-1285.4	15
RedWing	-27.00	187	-1039.6	17
50 lb Load	-28.58	212	-1097.9	19
Combat Boot	-28.73	185	-1006.2	21
Jungle Boot	-28.88	203	-1080.9	22
Reebok	-29.70	231	-1137.2	18
Nike CrossTrainer	-27.51	217	-1197.6	17
Rockport	-29.42	204	-1165.6	18
RedWing	-27.15	229	-999.2	17
70 lb Load	-28.63	238	-1155.2	22
Combat Boot	-29.34	211	-1081.1	19
Jungle Boot	-26.84	237	-1134.5	32
Reebok	-30.28	240	-1177.9	19
Nike CrossTrainer	-28.92	276	-1318.9	20
Rockport	-31.48	232	-1177.4	23
RedWing	-25.56	234	-1056.2	17
<u>F ratios</u>				
Fitness	<1	<1	2.44	2.06
Shoe	4.01*	1.63	10.44*	1.50
Fitness X Shoe	<1	<1	2.09	1.61
Load	2.24	2.89	<1	1.05
Fitness X Load	<1	3.93	<1	1.10
Shoe X Load	<1	1.65	1.91	1.36
Fitness X Shoe X Load	1.55	1.10	1.37	<1

Table G-10 - Ankle joint parameter means and *F* ratios during 0.72 m jump/landings for women (*N* = 15)

	Variables			
	LA1	LA2	LA3	LA4
<u>Conditions</u>				
Fitness				
Low	-39.17	243	-1211.8	23
Medium	-28.77	193	-1288.3	20
High	-27.53	235	-1317.3	23
Shoe				
Combat Boot	-31.10 <sub>a</sub>	209	-1091.1 <sub>a</sub>	21
Jungle Boot	-29.80 <sub>a</sub>	223	-1304.7 <sub>b</sub>	20
Reebok	-35.40 <sub>b</sub>	221	-1383.3 <sub>b</sub>	28
Nike CrossTrainer	-33.04 <sub>a b</sub>	239	-1378.1 <sub>b</sub>	23
Rockport	-32.50 <sub>a b</sub>	222	-1349.4 <sub>b</sub>	17
RedWing	-29.64 <sub>a</sub>	230	-1098.8 <sub>a</sub>	23
No Load	-32.78	210 <sub>x</sub>	-1253.9	23
Combat Boot	-31.74	195	-1072.3	20
Jungle Boot	-31.32	204	-1270.9	19
Reebok	-35.91	224	-1392.5	35
Nike CrossTrainer	-33.37	212	-1301.0	28
Rockport	-32.35	220	-1358.5	17
RedWing	-31.87	207	-1112.3	21
30 lb Load	-31.12	238 <sub>y</sub>	-1289.4	21
Combat Boot	-30.46	223	-1112.3	23
Jungle Boot	-28.10	245	-1342.6	21
Reebok	-34.89	219	-1374.2	20
Nike CrossTrainer	-32.67	268	-1464.9	18
Rockport	-32.65	224	-1340.4	17
RedWing	-27.41	253	-1085.3	26
<u>F ratios</u>				
Fitness	3.18	1.80	1.17	<1
Shoe	6.19*	1.93	7.49*	<1
Fitness X Shoe	<1	1.50	2.84*	<1
Load	3.24	35.19*	<1	<1
Fitness X Load	1.27	4.46	<1	<1
Shoe X Load	1.47	2.74	1.52	1.07
Fitness X Shoe X Load	1.40	1.80	<1	1.23

Appendix G

Table G-11 - Metatarsal joint parameter means and *F* ratios during 0.72 m jump/landings for men (*N* = 15)

	Variables			
	LMt1	LMt2	LMt3	LMt4
<u>Conditions</u>				
Fitness				
Low	18.67	36	368.66	29
Medium	14.96	99	266.14	36
High	22.91	54	419.70	35
Shoe				
Combat Boot	19.66	77 <sub>a</sub>	322.19 <sub>a</sub>	22
Jungle Boot	20.52	51 <sub>b</sub>	403.41 <sub>b</sub>	35
Reebok	16.00	56 <sub>b</sub>	362.96 <sub>a</sub>	41
Nike CrossTrainer	17.35	29 <sub>c</sub>	440.22 <sub>b</sub>	21
Rockport	17.86	40 <sub>c</sub>	350.21 <sub>a</sub>	31
RedWing	21.07	117 <sub>a</sub>	232.63 <sub>c</sub>	48
No Load	19.30	66	342.86	42
Combat Boot	20.21	113	288.98	22
Jungle Boot	20.57	62	348.01	45
Reebok	17.23	43	397.16	49
Nike CrossTrainer	17.75	20	391.88	22
Rockport	19.02	16	365.09	38
RedWing	20.72	124	227.00	73
50 lb Load	18.64	56	353.82	21
Combat Boot	19.54	56	347.22	18
Jungle Boot	20.19	52	412.30	20
Reebok	16.59	65	340.95	20
Nike CrossTrainer	17.11	33	443.32	20
Rockport	17.39	48	344.96	33
RedWing	21.14	77	249.87	18
70 lb Load	18.42	67	355.57	36
Combat Boot	19.17	58	334.51	26
Jungle Boot	20.76	38	400.91	38
Reebok	14.11	60	353.52	54
Nike CrossTrainer	17.13	35	491.50	21
Rockport	17.38	51	343.09	21
RedWing	21.34	151	221.02	52
<u>F ratios</u>				
Fitness	2.70	1.90	2.01	<1
Shoe	1.38	14.60*	24.21*	1.98
Fitness X Shoe	1.61	<1	1.87	<1
Load	<1	<1	1.66	2.31
Fitness X Load	4.31*	1.00	1.59	1.74
Shoe X Load	<1	1.25	2.82*	1.55
Fitness X Shoe X Load	<1	1.00	1.62	1.06

Table G-12 - Metatarsal joint parameter means and *F* ratios during 0.72 m jump/landings for women (*N* = 15)

	Variables			
	LMt1	LMt2	LMt3	LMt4
<u>Conditions</u>				
Fitness				
Low	14.01	65	254.72	42
Medium	14.33	67	306.62	45
High	17.70	87	306.84	64
Shoe				
Combat Boot	14.27 <sub>a</sub>	141 <sub>a</sub>	198.34 <sub>a</sub>	94
Jungle Boot	19.57 <sub>b</sub>	32 <sub>b</sub>	381.62 <sub>b</sub>	33
Reebok	11.78 <sub>a</sub>	62 <sub>c</sub>	304.69 <sub>b</sub>	35
Nike CrossTrainer	12.49 <sub>a</sub>	43 <sub>b</sub>	359.10 <sub>b</sub>	34
Rockport	14.65 <sub>a</sub>	75 <sub>c</sub>	249.78 <sub>a</sub>	48
RedWing	19.75 <sub>b</sub>	79 <sub>c</sub>	239.26 <sub>a</sub>	54
No Load	14.97	80	264.69	56
Combat Boot	14.40	154	178.01	99
Jungle Boot	18.56	48	332.34	42
Reebok	11.72	93	274.63	46
Nike CrossTrainer	11.64	48	320.41	31
Rockport	14.48	68	247.83	64
RedWing	19.51	66	229.10	54
50 lb Load	15.69	66	312.88	44
Combat Boot	14.14	128	218.66	90
Jungle Boot	20.70	15	437.05	23
Reebok	11.85	32	334.74	25
Nike CrossTrainer	13.45	38	402.62	39
Rockport	14.81	82	251.52	31
RedWing	19.99	92	249.42	55
<u>F ratios</u>				
Fitness	<1	<1	<1	1.15
Shoe	11.38*	5.70*	12.72*	2.04
Fitness X Shoe	1.23	1.43	2.01	1.27
Load	1.28	4.25	8.88	<1
Fitness X Load	<1	2.64	3.38	1.71
Shoe X Load	1.69	<1	1.30	<1
Fitness X Shoe X Load	1.17	<1	<1	<1

Table G-13 - Rearfoot movement parameter means and *F* ratios during 0.72 m jump/landings for men (*N* = 15)

Conditions	Variables				
	LRF1	LRF2	LRF3	LRF4	LRF5
<u>Fitness</u>					
Low	12.18	-8.24	165	20.37	-504.3A
Medium	7.37	-3.15	108	10.48	-319.7B
High	8.38	-7.02	158	15.42	-428.0C
<u>Shoe</u>					
Combat Boot	5.45	-7.54	161	12.80	-321.4
Jungle Boot	7.53	-7.20	146	15.45	-393.1
Reebok	10.73	-5.06	133	15.60	-440.3
Nike CrossTrainer	13.52	-4.87	146	17.29	-491.6
Rockport	9.71	-7.39	139	16.87	-438.8
RedWing	9.45	-5.05	139	14.74	-423.2
<u>No Load</u>					
Combat Boot	7.29	-6.35	133	13.62	-392.95
Jungle Boot	2.78	-8.52	151	11.27	-298.96
Reebok	5.94	-7.80	133	14.85	-378.26
Nike CrossTrainer	10.17	-4.54	119	13.76	-417.26
Rockport	10.91	-4.67	139	14.16	-440.97
RedWing	8.32	-6.89	129	15.21	-450.10
	6.65	-5.72	128	12.85	-378.46
<u>50 lb Load</u>					
Combat Boot	8.87	-6.79	152	15.78	-420.03
Jungle Boot	5.03	-7.91	170	12.61	-321.19
Reebok	5.82	-7.66	159	14.18	-355.18
Nike CrossTrainer	9.96	-5.74	144	16.04	-444.30
Rockport	12.42	-5.82	142	18.11	-508.66
RedWing	8.12	-8.64	146	16.64	-426.22
	11.57	-5.05	149	16.49	-457.46

Table G-13 - (continued)

	Variables				
	Lrf1	Lrf2	Lrf3	Lrf4	Lrf5
70 lb Load	11.95	-5.35	147	16.98	-443.62
Combat Boot	8.89	-6.02	161	14.72	-346.86
Jungle Boot	10.62	-6.18	148	17.14	-441.68
Reebok	11.85	-4.89	136	16.63	-459.43
Nike CrossTrainer	17.75	-4.11	155	19.50	-525.23
Rockport	12.89	-6.58	141	18.81	-441.63
RedWing	10.47	-4.37	141	15.10	-434.92
<u>F ratios</u>					
Fitness	<1	2.17	2.40	3.29	7.10*
Shoe	2.87	2.63	2.54	1.12	2.13
Fitness X Shoe	1.70	2.18	3.11*	2.71	1.93
Load	5.02	<1	2.53	1.92	<1
Fitness X Load	1.60	<1	1.30	3.83	<1
Shoe X Load	1.92	<1	<1	1.39	1.20
Fitness X Shoe X Load	1.77	1.49	<1	<1	1.66

Table G-14 - Rearfoot movement parameter means and *F* ratios during 0.72 m jump/landings for women (*N* = 15)

Conditions	Variables				
	Lrf1	Lrf2	Lrf3	Lrf4	Lrf5
<u>Fitness</u>					
Low	10.43	-3.68	102	13.59	-402.41
Medium	8.44	-0.81	98	9.58	-301.71
High	7.18	-3.18	119	10.30	-282.62
<u>Shoe</u>					
Combat Boot	8.50	-1.56a	96a	10.08	-305.30a
Jungle Boot	10.78	-2.05a	124b	12.98	-372.31b
Reebok	6.70	-3.97b	112b	10.44	-293.49a
Nike CrossTrainer	10.96	-0.44a	96a	11.17	-341.57ab
Rockport	8.56	-6.44b	95a	14.34	-424.84b
RedWing	7.05	-1.57a	115b	8.92	-251.88a
<u>No Load</u>					
Combat Boot	6.93X	-3.16	92	10.08	-307.89
Jungle Boot	6.53	-2.02	83	8.52	-264.17
Reebok	9.29	-2.71	115	12.08	-370.30
Nike CrossTrainer	3.05	-5.14	102	8.50	-258.81
Rockport	10.52	-0.49	72	10.83	-340.39
RedWing	5.94	-6.97	71	12.87	-380.52
	5.88	-2.10	114	7.67	-230.88
<u>50 lb Load</u>					
Combat Boot	10.55Y	-2.13	119	12.42	-350.40
Jungle Boot	10.25	-1.21	106	11.46	-337.29
Reebok	12.09	-1.48	132	13.89	-374.07
Nike CrossTrainer	10.88	-2.80	121	12.65	-328.18
Rockport	11.51	-0.38	124	11.62	-342.90
RedWing	11.19	-5.99	115	15.81	-463.63
	7.96	-1.17	116	9.88	-268.22



Table G-14 - (continued)

	Variables				
	LRf1	LRf2	LRf3	LRf4	LRf5
<u>F-ratios</u>					
Fitness	<1	<1	<1	2.35	2.04
Shoe	1.74	9.93*	8.73*	1.94	5.36*
Fitness X Shoe	<1	1.36	<1	1.52	3.43*
Load	15.39*	<1	6.66	1.86	2.71
Fitness X Load	3.48	<1	4.64	<1	<1
Shoe X Load	1.27	<1	1.21	<1	<1
Fitness X Shoe X Load	1.07	<1	1.07	1.39	2.54

Table G-15 - Medial Hamstring parameter means and *F* ratios during 0.72 m jump/landings for men (*N* = 15)

	LEMG1	Variables LEMG2	LEMG3
<u>Conditions</u>			
Fitness			
Low	-156.5	205.2	0.0198
Medium	-156.5	305.7	0.0248
High	-255.7	265.4	0.0292
Shoe			
Combat Boot	-182.5	261.1	0.0242
Jungle Boot	-202.9	241.7	0.0272
Reebok	-179.3	250.8	0.0229
Nike CrossTrainer	-185.6	277.1	0.0213
Rockport	-184.4	284.6	0.0266
RedWing	-200.9	237.1	0.0251
No Load	-179.7	253.7	0.0185
Combat Boot	-147.5	249.1	0.0165
Jungle Boot	-190.3	234.7	0.0223
Reebok	-163.7	272.9	0.0175
Nike CrossTrainer	-179.9	277.7	0.0179
Rockport	-182.4	278.3	0.0192
RedWing	-214.2	209.2	0.0171
50 lb Load	-187.2	247.1	0.0292
Combat Boot	-190.8	258.4	0.0270
Jungle Boot	-215.8	250.9	0.0313
Reebok	-176.9	237.7	0.0291
Nike CrossTrainer	-170.3	252.9	0.0222
Rockport	-172.9	291.9	0.0335
RedWing	-192.3	191.7	0.0318
70 lb Load	-200.9	275.0	0.0260
Combat Boot	-209.1	275.7	0.0284
Jungle Boot	-202.5	240.3	0.0283
Reebok	-194.5	241.8	0.0220
Nike CrossTrainer	-205.3	298.6	0.0238
Rockport	-197.9	283.6	0.0272
RedWing	-196.2	310.3	0.0264
<u>F ratios</u>			
Fitness	5.32	1.15	1.31
Shoe	1.24	<1	1.58
Fitness X Shoe	1.14	<1	<1
Load	<1	<1	2.34
Fitness X Load	<1	<1	1.53
Shoe X Load	<1	1.17	<1
Fitness X Shoe X Load	<1	<1	<1

Table G-16 - Medial Hamstring parameter means and *F* ratios  
during 0.72 m jump/landings for women (*N* = 15)

	LEMG1	Variables LEMG2	LEMG3
<u>Conditions</u>			
Fitness			
Low	-107.2	207.4	0.0155
Medium	-118.4	331.6	0.0320
High	-128.6	272.3	0.0220
Shoe			
Combat Boot	-131.8	218.4	0.0224
Jungle Boot	-119.1	284.9	0.0189
Reebok	-123.7	287.7	0.0234
Nike CrossTrainer	-97.1	285.5	0.0178
Rockport	-102.3	270.8	0.0201
RedWing	-133.9	266.4	0.0352
No Load	-118.5	237.5	0.0168
Combat Boot	-120.5	233.0	0.0177
Jungle Boot	-105.0	250.6	0.0139
Reebok	-126.3	278.2	0.0212
Nike CrossTrainer	-117.9	216.4	0.0151
Rockport	-100.7	235.4	0.0162
RedWing	-140.0	210.6	0.0166
50 lb Load	-117.7	301.1	0.0293
Combat Boot	-141.8	205.3	0.0266
Jungle Boot	-133.1	319.3	0.0240
Reebok	-121.0	297.1	0.0256
Nike CrossTrainer	-73.6	363.1	0.0208
Rockport	-104.0	306.1	0.0240
RedWing	-127.9	322.2	0.0538
<u><i>F</i> ratios</u>			
Fitness	<1	<1	1.10
Shoe	1.16	<1	1.21
Fitness X Shoe	1.58	<1	<1
Load	<1	1.28	4.45
Fitness X Load	<1	<1	3.06
Shoe X Load	<1	1.56	<1
Fitness X Shoe X Load	3.25*	2.29	1.00

Appendix G

Table G-17 - Rectus Femoris parameter means and *F* ratios during 0.72 m jump/landings for men (*N* = 15)

	LEMG1	Variables LEMG2	LEMG3
<u>Conditions</u>			
Fitness			
Low	-154.7	332.6	0.0642
Medium	-97.9	367.5	0.0645
High	-110.3	403.6	0.0478
Shoe			
Combat Boot	-113.7	375.4	0.0604
Jungle Boot	-125.2	361.8	0.0582
Reebok	-119.2	363.1	0.0614
Nike CrossTrainer	-114.9	369.3	0.0571
Rockport	-134.4	388.7	0.0622
RedWing	-121.1	348.0	0.0541
No Load	-111.2	301.9X	0.0410X
Combat Boot	-89.9	296.9	0.0386
Jungle Boot	-113.2	282.4	0.0448
Reebok	-103.6	280.8	0.0402
Nike CrossTrainer	-115.0	323.8	0.0445
Rockport	-131.1	344.3	0.0433
RedWing	-114.2	283.0	0.0348
50 lb Load	-129.7	372.7XY	0.0634XY
Combat Boot	-122.8	395.4	0.0642
Jungle Boot	-133.0	374.4	0.0538
Reebok	-127.7	365.9	0.0679
Nike CrossTrainer	-124.5	373.7	0.0655
Rockport	-140.2	383.7	0.0724
RedWing	-129.8	342.8	0.0574
70 lb Load	-122.4	428.8Y	0.0723Y
Combat Boot	-128.4	433.8	0.0784
Jungle Boot	-120.5	428.6	0.0760
Reebok	-126.4	443.0	0.0765
Nike CrossTrainer	-105.2	410.8	0.0620
Rockport	-131.8	438.2	0.0708
RedWing	-121.8	418.3	0.0702
<u>F ratios</u>			
Fitness	1.80	<1	<1
Shoe	<1	1.76	<1
Fitness X Shoe	<1	<1	<1
Load	2.84	6.79*	9.70*
Fitness X Load	2.68	3.94	4.52*
Shoe X Load	<1	<1	1.99
Fitness X Shoe X Load	<1	1.25	1.85

Table G-18 - Rectus Femoris parameter means and *F* ratios during  
0.72 m jump/landings for women (*N* = 15)

	Variables		
	LEMG1	LEMG2	LEMG3
<u>Conditions</u>			
Fitness			
Low	-165.7	319.7	0.0451
Medium	-163.1	366.9	0.0514
High	-168.5	415.0	0.0512
Shoe			
Combat Boot	-177.4	338.9	0.0472
Jungle Boot	-161.8	381.8	0.0479
Reebok	-170.8	383.1	0.0473
Nike CrossTrainer	-164.3	368.3	0.0500
Rockport	-159.3	347.2	0.0527
RedWing	-161.9	382.4	0.0503
No Load	-186.7	328.3 $\bar{X}$	0.0465
Combat Boot	-196.3	324.9	0.0446
Jungle Boot	-167.2	331.7	0.0427
Reebok	-209.8	329.1	0.0404
Nike CrossTrainer	-182.7	315.0	0.0446
Rockport	-181.3	297.3	0.0541
RedWing	-184.2	371.7	0.0524
50 lb Load	-145.3	405.4 $\bar{Y}$	0.0519
Combat Boot	-160.6	351.3	0.0494
Jungle Boot	-156.3	432.0	0.0531
Reebok	-131.8	437.0	0.0541
Nike CrossTrainer	-146.0	421.7	0.0554
Rockport	-137.3	391.7	0.0512
RedWing	-139.7	393.2	0.0481
<u><i>F</i> ratios</u>			
Fitness	<1	<1	<1
Shoe	<1	<1	<1
Fitness X Shoe	<1	<1	<1
Load	1.34	16.69*	<1
Fitness X Load	<1	2.87	<1
Shoe X Load	<1	1.04	1.38
Fitness X Shoe X Load	1.19	<1	1.28

Appendix G

Table G-19 - Anterior Tibialis parameter means and *F* ratios during  
0.72 m jump/landings for men (*N* = 15)

	LEMG1	Variables LEMG2	LEMG3
<u>Conditions</u>			
Fitness			
Low	-111.4	0.3236	0.0647
Medium	-89.8	0.2982	0.0572
High	-135.7	0.2937	0.0415
Shoe			
Combat Boot	-97.9	0.3142	0.0572
Jungle Boot	-112.4	0.2757	0.0510
Reebok	-108.3	0.3197	0.0527
Nike CrossTrainer	-127.1	0.2921	0.0592
Rockport	-120.9	0.3257	0.0580
RedWing	-107.1	0.3043	0.0491
No Load	-115.6	0.2526 $\mathbf{X}$	0.0426 $\mathbf{X}$
Combat Boot	-69.7	0.2603	0.0363
Jungle Boot	-110.9	0.2286	0.0436
Reebok	-127.5	0.2468	0.0404
Nike CrossTrainer	-137.6	0.2543	0.0501
Rockport	-133.8	0.2883	0.0458
RedWing	-110.6	0.2381	0.0391
50 lb Load	-103.8	0.2984 $\mathbf{Y}$	0.0477 $\mathbf{Y}$
Combat Boot	-107.3	0.2902	0.0446
Jungle Boot	-115.4	0.2650	0.0406
Reebok	-82.5	0.3235	0.0381
Nike CrossTrainer	-106.9	0.2882	0.0595
Rockport	-107.3	0.3469	0.0610
RedWing	-103.4	0.2780	0.0426
70 lb Load	-117.4	0.3648 $\mathbf{Z}$	0.0730 $\mathbf{Z}$
Combat Boot	-114.3	0.3878	0.0891
Jungle Boot	-111.0	0.3334	0.0689
Reebok	-114.8	0.3890	0.0783
Nike CrossTrainer	-135.0	0.3373	0.0688
Rockport	-121.8	0.3419	0.0671
RedWing	-107.4	0.3969	0.0657
<u><i>F</i> ratios</u>			
Fitness	<1	<1	1.65
Shoe	<1	<1	<1
Fitness X Shoe	<1	<1	<1
Load	1.86	10.46*	6.28*
Fitness X Load	<1	2.51	1.97
Shoe X Load	1.52	<1	1.71
Fitness X Shoe X Load	<1	<1	1.50

Table G-20 - Anterior Tibialis parameter means and  $F$  ratios during  
0.72 m jump/landings for women ( $N = 15$ )

	Variables		
	LEMG1	LEMG2	LEMG3
<u>Conditions</u>			
Fitness			
Low	-207.1	279.3	0.0525
Medium	-189.1	260.8	0.0412
High	-128.2	333.3	0.0484
Shoe			
Combat Boot	-171.1	294.8	0.0531
Jungle Boot	-172.3	280.2	0.0449
Reebok	-180.9	294.4	0.0493
Nike CrossTrainer	-168.6	288.7	0.0418
Rockport	-169.1	280.1	0.0455
RedWing	-184.6	314.5	0.0511
No Load	-194.8	279.7	0.0467
Combat Boot	-191.8	314.4	0.0538
Jungle Boot	-184.2	247.9	0.0407
Reebok	-206.1	285.8	0.0423
Nike CrossTrainer	-200.7	272.3	0.0423
Rockport	-195.2	256.1	0.0502
RedWing	-190.3	305.6	0.0517
50 lb Load	-153.6	304.5	0.0484
Combat Boot	-152.8	277.4	0.0524
Jungle Boot	-158.9	316.6	0.0498
Reebok	-155.7	303.0	0.0562
Nike CrossTrainer	-136.4	305.0	0.0412
Rockport	-143.0	304.0	0.0408
RedWing	-178.3	324.6	0.0504
<u>F ratios</u>			
Fitness	<1	<1	<1
Shoe	<1	<1	<1
Fitness X Shoe	<1	<1	<1
Load	1.30	<1	<1
Fitness X Load	<1	<1	<1
Shoe X Load	2.41	<1	<1
Fitness X Shoe X Load	1.83	<1	<1

Appendix G

Table G-21 - Gastrocnemius/soleus parameter means and *F* ratios during 0.72 m jump/landings for men (*N* = 15)

	LEMG1	Variables LEMG2	LEMG3
<u>Conditions</u>			
Fitness			
Low	-307.1	123.6	0.0813 <sup>A</sup>
Medium	-288.3	107.7	0.0447 <sup>B</sup>
High	-273.3	141.4	0.0457 <sup>B</sup>
Shoe			
Combat Boot	-271.5	131.6	0.0593
Jungle Boot	-291.6	115.6	0.0564
Reebok	-289.3	139.4	0.0611
Nike CrossTrainer	-293.0	129.9	0.0532
Rockport	-286.1	100.9	0.0505
RedWing	-306.5	127.7	0.0634
No Load	-287.2	117.6	0.0481
Combat Boot	-218.8	135.7	0.0413
Jungle Boot	-282.4	108.7	0.0456
Reebok	-303.8	120.5	0.0574
Nike CrossTrainer	-311.7	109.8	0.0434
Rockport	-299.5	101.4	0.0434
RedWing	-307.2	129.6	0.0567
50 lb Load	-299.4	124.9	0.0604
Combat Boot	-314.4	134.1	0.0688
Jungle Boot	-314.5	116.0	0.0590
Reebok	-298.6	165.0	0.0663
Nike CrossTrainer	-280.7	141.2	0.0545
Rockport	-282.3	92.2	0.0538
RedWing	-305.8	103.2	0.0605
70 lb Load	-282.7	130.0	0.0635
Combat Boot	-285.0	124.9	0.0672
Jungle Boot	-276.5	125.3	0.0655
Reebok	-265.4	122.6	0.0596
Nike CrossTrainer	-285.5	132.6	0.0617
Rockport	-276.7	139.6	0.0542
RedWing	-306.6	109.0	0.0730
<u>F ratios</u>			
Fitness	<1	<1	14.20*
Shoe	1.62	1.26	2.31
Fitness X Shoe	<1	<1	5.33*
Load	1.25	<1	<1
Fitness X Load	2.18	<1	<1
Shoe X Load	1.92	<1	1.51
Fitness X Shoe X Load	1.34	<1	1.12



Table G-22 - Gastrocnemius/soleus parameter means and *F* ratios  
during 0.72 m jump/landings for women (*N* = 15)

	Variables		
	LEMG1	LEMG2	LEMG3
<u>Conditions</u>			
Fitness			
Low	-305.6	125.6	0.0505
Medium	-254.5	160.8	0.0518
High	-249.6	212.2	0.0327
Shoe			
Combat Boot	-289.9	141.3	0.0470
Jungle Boot	-292.9	158.6	0.0451
Reebok	-251.0	195.1	0.0444
Nike CrossTrainer	-261.1	150.7	0.0427
Rockport	-257.7	158.7	0.0449
RedWing	-273.4	183.9	0.0473
No Load	-253.4	147.9	0.0431
Combat Boot	-280.9	151.4	0.0476
Jungle Boot	-260.6	151.4	0.0402
Reebok	-243.3	188.7	0.0453
Nike CrossTrainer	-238.7	131.2	0.0392
Rockport	-263.9	133.1	0.0447
RedWing	-239.4	132.2	0.0424
50 lb Load	-287.2	182.6	0.0472
Combat Boot	-297.8	132.5	0.0465
Jungle Boot	-325.2	165.7	0.0499
Reebok	-258.7	201.4	0.0436
Nike CrossTrainer	-283.6	170.2	0.0461
Rockport	-251.4	184.3	0.0451
RedWing	-307.4	235.7	0.0522
<u>F ratios</u>			
Fitness	<1	1.00	1.40
Shoe	2.82	<1	1.75
Fitness X Shoe	<1	<1	<1
Load	2.85	5.91	<1
Fitness X Load	1.08	2.14	<1
Shoe X Load	1.81	3.72*	2.88
Fitness X Shoe X Load	1.48	3.18*	2.02

**APPENDIX H**

**MEANS AND *F* RATIOS**  
**FOR**  
**TIME TO COMPLETE THE AGILITY COURSE RUN**

Table H-1 - Agility course time means and *F* ratios for men (*N* = 15)

	Time (s)
<u>Condition</u>	
Fitness	
Low	12.45
Medium	13.04
High	12.60
Shoe	
Combat Boot	13.09 <sub>a</sub>
Jungle Boot	12.84 <sub>a</sub>
Reebok	12.37 <sub>b</sub>
Nike CrossTrainer	12.22 <sub>b</sub>
Rockport	12.75 <sub>a</sub>
RedWing	12.93 <sub>a</sub>
No Load	11.83 <sub>x</sub>
Combat Boot	12.22
Jungle Boot	12.04
Reebok	11.53
Nike CrossTrainer	11.25
Rockport	11.88
RedWing	12.09
50 lb Load	12.85 <sub>y</sub>
Combat Boot	13.16
Jungle Boot	13.09
Reebok	12.51
Nike CrossTrainer	12.40
Rockport	12.90
RedWing	13.04
70 lb Load	13.42 <sub>z</sub>
Combat Boot	13.89
Jungle Boot	13.39
Reebok	13.06
Nike CrossTrainer	13.01
Rockport	13.47
RedWing	13.66
<u>F ratios</u>	
Fitness	1.74
Shoe	12.57*
Fitness X Shoe	<1
Load	58.77*
Fitness X Load	40.43*
Shoe X Load	1.10
Fitness X Shoe X Load	1.08

Table H-2 - Agility course time means and *F* ratios for women  
(*N* = 15)

	Time (s)
<u>Conditions</u>	
Fitness	
Low	13.34
Medium	13.91
High	13.42
Shoe	
Combat Boot	13.79 <sub>a</sub>
Jungle Boot	13.69 <sub>a</sub>
Reebok	13.42 <sub>b</sub>
Nike CrossTrainer	13.13 <sub>b</sub>
Rockport	13.52 <sub>b</sub>
RedWing	13.79 <sub>a</sub>
No Load	12.85 <sub>x</sub>
Combat Boot	13.04
Jungle Boot	12.95
Reebok	12.70
Nike CrossTrainer	12.42
Rockport	12.88
RedWing	13.10
50 lb Load	14.26 <sub>y</sub>
Combat Boot	14.53
Jungle Boot	14.43
Reebok	14.13
Nike CrossTrainer	13.84
Rockport	14.16
RedWing	14.49
<u>F ratios</u>	
Fitness	1.42
Shoe	3.63*
Fitness X Shoe	1.74
Load	179.12*
Fitness X Load	91.90*
Shoe X Load	<1
Fitness X Shoe X Load	<1

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